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Some Aspects of Feeding in Relation to Livestock Disease*

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In a recent article, Hart (1938) has some interesting observations to make upon the general subject of nutrition in relation to animal health and disease, and I would like you to allow me to read some few extracts from his paper, in order to show that we in this country are not alone in having to face a problem which is becoming of great importance and about which we are still, I think, rather lamentably ill-formed.

Hart says :—

"There are often stages in the progress of elucidation on the frontiers of knowledge when all the links in the chain of necessary facts for complete understanding have not been obtained. Under these conditions that which appears to be truth may be only half truth. Such a condition may exist over a period of years in even a very narrow part of a problem where intensive work is being prosecuted. This is the period when shrewd commercialism has its innings, and it proceeds 'to make hay while the sun shines,' knowing full well the period for profit may be very temporary.

"The field of nutrition during recent years has presented golden opportunities for this type of exploitation. It is logical, therefore, that a professional group such as this Association† should be confronted with more or less confusion."

These words could, I feel sure, have been said equally well about our own N.V.M.A. members. Further on, Hart says :—

"To-day we recognise that nutrition is a very involved field of knowledge with new facts of wide importance being uncovered constantly and the end is not in sight. The highly artificial conditions under which our animals are maintained in fenced enclosures and fed more and more upon the by-products of industry, render their rations very far removed from what obtains under natural conditions."

And again later :—

"We must, therefore, not overlook the possible place of nutritional deficiences as aetiological factors in abnormalities of livestock and give them a place along with bacteria, parasites and hereditary defects. . . ."

The changing attitude to the functions of the veterinarian which we see in this country, in the British Dominions, and in the British Colonies, is also in evidence in nearly every country where progressive and constructional thought is brought to bear upon the welfare of livestock. We must no longer be content to pursue a negative policy of curative treatment; it is essential if we are to fulfil our proper function, to adopt a positive policy of active prevention of disease.

One of the important factors in the prevention of diseased conditions among animals is a knowledge of, and the application of a knowledge of, correct nutritive treatment.

INTRODUCTION

I find it is quite impossible to pretend to cover this huge subject in anything like an adequate manner in a reasonable time, and have decided to choose only some few aspects to put before you. Some of these have, I submit, a very direct bearing upon veterinary practice and I feel do not always receive due attention; others you may well decide are to a large extent academic. I make no apology, however, for including these latter, since none can say when the subject of purely academic interest will become of practical importance.

I shall hope to convince some of you that while there are without doubt numerous instances in which foods and feeding are at fault, it is as yet quite impossible to explain all the details of the physiological or pathological processes which occur within the system and combine to bring about ill-health.

I would also like to state that I propose to make but brief reference to ill-health or disease brought about by the use of foods containing specific deleterious substances or poisons, since

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†The American Veterinary Medical Association.

I regard this aspect of the subject in a different category from that with which I propose to deal. Similarly, I do not propose to do more than mention vitamins, although I would be the first to agree that they may be of paramount importance in the feeding of some species of domesticated mammals and birds—for they have been dealt with in a recent paper by Mr. N. J. Scorgie to the Midland Division of the N.V.M.A. Further, much of the well established work concerning certain minerals (perhaps particularly Ca, P_4 and Mg) will at most only be briefly referred to, for there can be no object in including in a paper such as this, information which has already been incorporated into the standard text-books.

General

Before discussing the subject in detail, there are certain general observations regarding the position at present occupied by food-producing animals in Britain, which are, I think, of great importance. The farm animals in this country have been gradually changed by the activities of breeders and feeders, into creatures which require a very different type of dietary intake from those from which they are descended. The modern dairy cow must eat and deal with a far heavier and richer diet than the wild cow, her ancestor. Probably under wild or semi-wild conditions, little more than about 100 to 150 gallons of milk were excreted at each lactation. In African colonies, indigenous breeds of native cattle, when milk-recorded, seldom give more than 250 gallons in a lactation. You are all familiar with the enormous yields given by cows of the modern British (or American) dairy types. To enable high levels of production of this nature to be achieved, the fuel intake must be correspondingly heavy, and the hyper-functioning of the digestive, circulatory, and excretory organs in particular, is correspondingly greater. At the same time, we must realise that in ratio as the capacity to produce more milk has been improved by selective breeding and more intensive management, so have the individual organs of the cow's system become hypertrophied either in form or function, or both, and are capable of dealing with heavier rations. The result of this is that a level of feeding which might readily kill a native African cow, can be tolerated by a cow of a modern British dairy breed. It helps one to appreciate the position, if we regard the problem as of the nature of a race between the capacity of the cow to produce more and the capacity of the systemic organs to perform this increased functioning without suffering. The same remark, suitably modified, applies to other classes of livestock—pigs, poultry, bullocks, sheep, and even horses.

Influence of Exercise

I am strongly of the opinion that we, as a profession, not less than the practical livestock owner, have not paid enough attention to the great importance of exercise in those food animals which are shut up early and fattened intensively to produce a carcase of greater size and earlier maturity than the normal. Similarly, the heavy producing cow, the intensively kept "battery" laying hen, and even the young pedigree bull or ram being forced for show or sale purposes, are each denied in a very large measure the benefits of exercise.

This country is experiencing a wave of enthusiasm for increasing national fitness by a greater indulgence of the human body in various exercises and pursuits which improve blood and lymph circulation, respiration, neuro-muscular co-ordination, digestion, and excretion of waste products, etc. No one doubts the benefits which result to the human animal, but we are not yet urging upon animal owners the corresponding importance of adequate exercise for livestock. In counties situated in the southern parts of Britain, the winter weather is not usually so inclement as to preclude the use of pastures by the dairy herd for much more than a week or ten days at a time. In the north, however, especially on exposed farms, there may be long spells of severe weather during which milking cows cannot with safety be turned out-of-doors for any length of time. Even there, however, daily exercise in an open yard, along a lane, or in a sheltered paddock is highly desirable for an hour or two daily.

I feel that there should be no need for me to enumerate the benefits of exercise upon the animal's system, further than to mention that it is capable of toning up every organ and tissue of the body, acting either by direct massage, or by the more indirect stimulus given to the circulatory and respiratory tissues. I think it well merely to say that it is impossible to consider feeding in relation to disease without also considering the impact which adequate or inadequate exercise may have upon the animal. The literature contains many references to the improvement in peristalsis, assimilation, and digestion, etc., and to the better utilisation of the food which result from providing adequate exercise. (*Vide*: Duke (1935), Smith (1921), Colombus (1936), etc.)

Diseased Conditions Associated with Feeding

I would like to draw your attention to some conditions which are typically regarded as being due to errors in feeding. Some of these I think may be dismissed in a few words only, because they are quite well known to you all.

For purposes of illustration it is convenient to

divide these into different categories. The following divisions are purely arbitrary, and since some conditions do not lend themselves to ready classification, should not be regarded as at all rigid.

(*a*) *Overfeeding with Balanced Foods.*

Among conditions which fall into this category, but which may be brought about by other associated factors (such as lack of exercise or work), are : various forms of colic ; myohaemoglobinuria, lymphangitis (non-specific), urticaria, and some forms of male or female sterility or infertility. Diffuse lipomatosis, or over-fatness, which used to be regarded as a desirable condition in cattle and sheep for show or sale purposes, is in extreme cases, in my opinion, also a pathological condition. Fortunately, the public no longer demands the excessively fat joint, and apart from animals fed for the December fat stock shows, we do not so often see the gigantic over-fattened steers which were commoner earlier. There is, I think, no need to recapitulate details pertaining to the specific conditions mentioned. You must all be sufficiently familiar with them.

(*b*) *Overfeeding with one or more Food Principles.*

When the rations are in an unbalanced condition, particularly when there is an excess of one, the digestion and assimilation of the whole of the food may be readily upset, and illness follows. A useful example to take is that of fat. The full details of the oxidation of fats down to their end products—H_2O and CO_2—are not yet fully known, but the most widely accepted theory is that of Leathes and Raper. This very briefly is as follows : After absorption, hydrolysis and enzyme action, the fat is split into glycerol and the appropriate fatty acid. The glycerol is utilised by the body tissues as any other soluble carbohydrate, being oxidised to H_2O and CO_2. The fatty acid is catabolised into an alcohol first, and then into a ketone. The ketone loses its carbon atoms which are oxidised into CO_2, and the hydrogen atoms are similarly oxidised into H_2O. The normal end products of the fatty acids are, therefore, the same as those of the carbohydrates. Should there be a gross excess of fat (or a deficiency of carbohydrate or O_2), the breakdown stops at the ketone stage. Ketone bodies accumulate in the liver first and then in the blood stream, leading to the condition which we call ketosis or *ketonaemia* clinically. Should the process of oxidation cease at the ketobutyric acid stage, this is converted into acetone and CO_2 and we get a condition of *acetonaemia*. Excretion into the urine gives *acetonuria*, and by the mammary gland gives acetone milk, etc. Any excess of acetone bodies in the blood, since they are strongly acid, uses up the alkali reserve there and the condition of *acidosis* results. Clinically it may be possible to recognise acetonaemia by odour and symptoms or by tests ; the condition of bovine acetonaemia is now well recognised. Appropriate treatment is, of course, now well known—the use of a rapidly absorbable soluble carbohydrate, such as glucose, or galactose.

If I am reiterating something which you all know, you must forgive me. I want to use it to illustrate a further point. The association of excess of fat with the ketosis-acidosis train of events is well known, but what is I think not so well appreciated is that by feeding to cows and sheep especially, an excess of certain proteins containing amino-acids which are catabolised into very similar end-products, an almost identical condition of acidosis may be produced. A practical illustration of this is given by pregnancy toxaemia in ewes. It has been known for a long time that deficient carbohydrate intake with excess of fats is associated with the production of pregnancy toxaemia in ewes. By keeping in-lamb ewes upon rich early spring grass about two to four weeks before lambing, pregnancy toxaemia, indistinguishable from that occurring naturally, can be produced. The grass at this stage is excessively rich in protein containing ketogenic amino-acids. I do not wish to give you the impression that this condition of pregnancy toxaemia is by any means a simple one, for quite recently Roderick, Harshfield and Hawn (1937) have shown that it can be produced in pregnant ewes and even in non-pregnant ewes and lambs (more slowly) by shutting them up in a bare box and supplying them with water but giving no food at all. Presumably, in those cases, the animal mobilises its own fat reserves and not having any intake of carbohydrate, fails to effect normal fat oxidation.

I think it is necessary to refer here to some work done by Gordon (1934) in which toxins of *Clostridium welchii* (Type D) were recovered from cases of pregnancy toxaemia. This suggests that while dietetic errors may be the primary cause, a toxaemia resulting from alimentary dysfunctioning may readily be responsible for the fatal termination that is so common in this somewhat baffling condition. So far as I can learn, the present lambing season has been exceptionally free from pregnancy toxaemia, in comparison with 1936 and 1937.

Excess of proteins in the diet, as well as causing acetonaemia, may act in another way to produce illness. It is common knowledge that when proteins are ingested, not all are utilised by the body tissues. Bacterial action brings about a greater or lesser degree of putrefaction in the intestines, and some of the amino-acids of the protein are changed into amines, phenols, various organic acids, etc.,

some of which are toxic. These, after absorption, must be detoxicated (or deaminised) to protect the more essential body cells from their harmful action. Most of the detoxication process occurs in the liver; some changes also probably take place in the kidneys. Normally, the defence mechanisms of the body are quite capable of effecting these changes, but when excess of proteins are constantly taken in, and especially when exercise is restricted so that peristalsis is slowed down and bowel action is sluggish, general effects become noticeable. The faeces assume an offensive odour—usually readily detected on first entering a cow-house or stable which has been shut up for some time previously. Urine is thicker and more viscid than normal, of high specific gravity, and in pronounced cases of some duration, the skin shows eruptions or scaliness, appetite is impaired or lost, the breath may have a strong unusual taint, and there may be some oedema in dependant parts of the body (the horse's legs may "fill up," for example).

I think it is well to point out that there is a very general tendency among farmers and livestock producers to feed too much protein to all animals. Admittedly, the body requires adequate protein, when it is producing such substances as eggs, milk, a foetus, or wool; similarly, the young growing animal requires protein for normal development; but the adult animal, which is not producing a large amount of nitrogenous material, requires only sufficient protein to replace normal wear and tear of its tissues. Any excess fed is not only wasteful (being the most expensive food principle) but may be actually harmful by throwing an extra strain upon the organs concerned with detoxication and excretion.

Of very much more importance is the quality of the protein—or more correctly the particular varieties of amino-acids which constitute the proteins. A brief account of the importance of the amino-acids was given some time ago to the Central Society (Miller, 1935). It will serve no useful purpose to recapitulate, but I think it might be advisable to draw your attention to some of the principal foods for farm livestock which contain proteins of high biological value. The chief of these are:—

(1) *Animal Products.*—Milk, low temperature processed blood and bone meal, white fish meal, whale products, meat and bone meal.

(2) *Vegetable Products.*—Young growing spring grass, lucerne, tares, clovers, etc., best quality artificially dried lucerne and grass, beans, peas, and other legumes (including soya beans), ground nut products.

Some of the oleaginous seeds do not possess proteins of very high biological value; that of linseed, for example, with a value of 46, is not so good as that of beans which is 59, or peas with 64 (Morris). The cereal proteins are similarly not of first quality rank, though they can be tolerated in excessive amounts better than can some of those mentioned above.

(c) Underfeeding and Deficiencies in Diet.

Quite frankly, the subjects which could be included under this title are so numerous and complicated that it is very difficult to know what to mention and what to omit.

In the first place, you must all be familiar with the harm that is done by under-nutrition. To crystallise one's thoughts, one has only to consider such conditions as: rachitis in all animals, mineral deficiency diseases such as pining, bush sickness, nutritional anaemia of young pigs, iodine deficiencies (goitres), and calcium magnesium and phosphorus deficiencies, the many avitaminoses, and so on, to realise that there is a very formidable list of disease processes associated with one or another form of under-nutrition.

Before considering any specific deficiency, I think it might be well to consider under-nutrition in relation to parasitism. It is a very general observation that the most heavily parasitised members of a flock or herd are almost invariably those which are in poorest bodily condition. There are those who hold that this is because infestation with parasites has disturbed and hindered normal nutritive intake, and there are those who hold that parasites can infest an animal which is already in poor condition more readily than they can one which is in robust health. Some evidence can be brought to support each viewpoint, but none of it seems absolutely conclusive. Personally, I lean towards the view that in very many cases animals which are already in a poor underfed state succumb to a degree of parasitic invasion which a vigorous robust adequately fed animal would resist. The former becomes a clinical case, while the latter though harbouring some few parasites achieves a balanced symbiosis and survives. Though I am prepared to admit that exposure to abnormally heavy infestation will over-ride the powers of resistance of even the healthiest individual animal at times, I feel that given normal conditions a general raising of the quality and character of the food, together with rational management, would go a long way to remove a source of much loss from parasitism. It is possible, I think, to produce a strong argument in favour of better nutrition for young stock on these grounds alone. I would prefer to have the views of practitioners present, however, and I hope that during the discussion this aspect may be raised.

To return to a consideration of generally inadequate nutrition, I think that we are reaching a stage when we are beginning to

realise that our application to livestock feeding of the principles of theoretical nutrition and the making up of so-called "adequate rations," calculated upon a basis of carbohydrate, fat, protein, fibre, mineral and vitamin requirements, so far as we know them, are not always adequate for the modern heavy producing animal. The more artificial a ration becomes, and the more an animal's natural mode of feeding is interfered with, the more noticeable is the gradual accumulation of trouble that the particular species experiences. I am not at all convinced that we should not lay a great deal of blame upon the compound cake or nut. The use of various so-called "balanced" cakes, compound meals, nuts, etc., is at present enormous in Great Britain. The number of different firms which sell a compound cake or food of a secret composition, for which a totality of virtues is claimed, is only less than the number of firms dealing with quack medicines. Some of these compound products do undoubtedly bear the closest scrutiny, and it is very hard indeed to criticise them adversely. There are, however, unfortunately other products, usually made by smaller concerns, which are definitely inferior. In some cases, the ingredients are declared.

We have had samples sent in which were stated to have a certain composition. Upon examining the current market prices of the various component substances and pricing the compound cake according to the amounts of each present, we reached a total cost of 22s. in one case and 18s. 3d. in another per ton *more* than the cake was being charged to the farmer.

It is difficult to believe that any firm would be prepared to give away 22s. worth of food with each ton paid for by the purchaser! Examination of one of these samples showed a fibre content higher than should have been present according to the declared composition. The explanation would seem to be that either very inferior qualities of some foodstuffs were being used, or else that adulteration with some fibrous by-product was being carried out. Either practice leads to a sense of false security on the part of the owner and is calculated to bring about an inferior standard of nutrition, with consequent risk of subnormal levels of health and production. You may ask what is the solution? I feel that if we could educate farmers to use a greater amount of sound, wholesome, home-grown, fresh or freshly-ground foodstuffs in preference to the imported article, we should be doing the farmer and his livestock a very distinct service.

There are two very important facts relating to home-grown and imported foodstuffs, which have a bearing upon this matter though they are by no means the whole of the story. Horses, cattle and sheep in particular, grazing naturally upon living plants in a good average pasture are usually able to supply themselves with adequate amounts of Ca, since stems, grass blades and leaves are normally rich in calcium. These parts of the plant are, however, poor in phosphorus. Conversely, animals living largely on concentrates, by-products, seeds, and so on, are taking in adequate phosphorus, but are eating a diet deficient in calcium. To my mind, however, a more important consideration is the deterioration that occurs with storage of by-products, etc. In one or two instances we know that storage of a food product in light, heat, moisture, and air, is attended by complex derogatory changes. The small amount of fats present in association mainly with the germ of cereals, for example, undergo a process of auto-oxidation and may develop a certain degree of rancidity. During this, aldehydes, ketones and fatty acids are formed. Some of these substances may be harmful to the animal when eaten over a long period of time. Our knowledge of the exact nature of the harm done, and whether or no the substances are to any extent cumulative or not, is inadequate. Madson *et alia* (1935), showed in this connection that cod liver oil might produce a form of muscular degeneration in guinea-pigs, rabbits, sheep and goats, when fed either with a synthetic diet, or when added to the normal rations, unless care was taken not to exceed a normal intake. Calves, however, appeared to be resistant to similar injury. The harmful substance was not identified.

Our knowledge is similarly incomplete with reference to the changes in proteins and carbohydrates which occur during storage of grain, meals or forage foodstuffs. There is ample evidence to show that serious deterioration in general food value occurs during storage rapidly in all cereal by-products, particularly those which are finely ground. The particles of a meal, for example, become partially oxidised from long exposure to atmospheric air in sacks or on a granary floor.

Most of the foods with a high protein content are notoriously difficult to keep in store for any length of time, even under ideal conditions. Sourness, fermentative changes and general deterioration result. These changes undoubtedly have an adverse effect when foods are eaten. (I wish to make it clear that I do not refer to damage and harmful effects arising from moulds, dampness, infestation with weevils and other *Acari*, etc., which can usually be readily detected on examination of the foodstuff.)

I am suggesting in the above paragraphs that by the excessive use of various types of by-products, especially during winter months, for animals which are housed indoors we may regard a ration as being theoretically adequate whereas actually it may be markedly deficient or even

harmful, owing to the deterioration which has occurred during storage.

Before leaving this aspect, I think I would like to mention a point concerned with carbohydrates. There is, so far as I know, no very useful evidence of harm resulting from overfeeding with carbohydrates as a group. The herbivores are especially equipped for dealing with a far larger intake of carbohydrate in the form of fibre than are other animals, but even with them there comes a time when the amount of crude fibre in the ration becomes too high. In a year when weather prevents the making of good hay—such as last year was in many districts—we are, I think, prone to over-estimate the actual nutritive value of feeding hay. From analyses which have been carried out by numerous different workers in Britain, one is faced with the fact that hay is about the most variable foodstuff which can be given to animals. It varies according to the nature of the soil on which it is grown, according to manurial treatment, according to the botanical composition of the grasses or legumes of which it is constituted, according to the season, and particularly perhaps according to the methods of haymaking, and finally it varies according to the time and method of storage in stack or Dutch barn, etc.

It is only possible to give a very general opinion of the real nutritive quality of a sample of hay by inspection: to know enough about it to pass a more scientific opinion, an analysis of its mineral, protein and carbohydrate contents, is also required.

We have not infrequently found that although no actual diseased condition may be produced, cows especially, are liable to suffer from feeding an inferior type of hay, which yet may appear to be a fair sample when examined carefully. Milk yield falls first, the coat becomes dry and staring, and condition is lost. I would suggest that you may find it well worth while to advise your clients to have samples of hay analysed, before assuming that it is capable of fulfilling its normal place in the feeding of animals, whenever any question of its quality arises, rather than trust to its general appearance and characters. Especially interesting is the amount of crude fibre present. Store cattle, heifers which are to be kept on for breeding, and colts are, I feel, only too often given a ration which has too high a fibre content. I quite agree that with store cattle which are destined to fulfil no breeding functions, the quality of the food during the store period is of less importance than with other classes of stock, and it is generally held that so long as the stores are reasonably well-grown and healthy looking, it does not greatly matter if they are in poor condition at the beginning of the grazing or fattening period. At the same time it is obvious that the worse the condition of the stores at the start of fattening, the longer it takes to finish them and the less economic is the process. An excess of crude fibre in the diet of stores cannot but exert an adverse influence upon the quality of the finished product. One has seen stores, wintered upon oat straw and turnips, and getting little else but a modicum of coarse non-nutritious herbage from rough-grazings, suffering from chronic constipation, hard, dry and staring in the coat, with sunken eyes and little or no flesh, which were regarded by the owner as being in "fine hardy condition," ready to "go ahead" as soon as the grass comes. In actuality such animals are undoubtedly in sub-normal health, even if they are not actually pathological. It is animals of this class which are most prone to suffer from parasitic invasion, hoose, liver-fluke, etc., if opportunity for infestation arises. I very much fear that much of this state of affairs also applies to the heifers on some breeding farms, and I feel that the foundations of a good deal of the troubles we see in breeding cows later, are laid in this stage of the animal's life. In particular, much of blame can be laid upon inadequate calcium, phosphorus and magnesium intakes during the growing stage. The heifer to be retained for further breeding has, under modern conditions, only a limited time (up to the age of about 21 months, when she is usually served, and very often less than this) during which she can not only complete her own body growth but build up some reserve of minerals in her bones to serve her for future needs. It has not yet been clearly shown whether hypocalcaemia (milk fever) and hypomagnesaemia—to mention two conditions only—could not be prevented by feeding adequate minerals and the catalysts necessary for assimilation to the calves and heifers in a herd which are destined to become heavy milking cows in later life. I am, of course, aware that the present widely accepted view of the causation of milk fever is the inability to mobilise calcium from bone stores, when the udder makes its first sudden demand upon the amount present in the circulating blood stream. I think I am right in saying, however, that the whole of the mechanism involved in the production of clinical milk fever has not yet been elucidated. It may be that quite other functions are involved. It will probably not be until a method is devised for producing this condition artificially that we can hope to have the full explanation of the physio-pathology of this condition.

You will note that I have avoided attempting to deal with any one specific condition in which there can be presented a precise picture of the effects of an absence or deficiency of some particular substance. I could not possibly deal with more than one or two conditions in the time available. The list of even the mineral deficiencies is now a most formidable

one, and it would have been extremely difficult to have chosen from it some few conditions to present to you. I trust I have interpreted your wishes correctly in keeping a broad basis. I sometimes think that we are in danger of losing sight of the broader functions of rations by paying too much attention to detailed ingredients. I would like, consequently, to remind you that before considering the detailed substances to be supplied, a ration should be adjusted to fulfil certain more general criteria. It should be suitable for the particular species of animal; it should be made up from good quality fresh ingredients; it should be palatable; it should be adequate to satisfy the animal's normal appetite; it should contain enough bulk to effect optimal visceral distention, and provide a stimulus to peristalsis, secretion and blood and lymph circulations; it should be neither unduly laxative nor binding; it should have a good digestibility, and it should be supplied in adequate but not excessive quantities. Most of these requirements concern the farmer. I believe that on the whole livestock feeding is gradually improving. There are, however, still far too many men who feed quite unscientifically and wastefully, chiefly because they have not taken the trouble, or have not had sufficient interest, to change. The wasteful method of giving every cow in a milking herd exactly the same amount of food irrespective of her yield will usually be readily recognised by the condition of the individual cows. Some will be very fat—these are those with a poor yield for whom the ration is excessive; some will be thin and even emaciated—the heavy milkers, which are not receiving an adequate intake of food; while the remainder will be intermediate. It only requires a moment's thought to show how wasteful a process this is. By advising and persuading owners to feed according to production and performance, we are saving a wastage of cattle food and making agriculture a little more efficient. Such ancillary functions will, I feel, become of increasing importance to the profession in future. There are great opportunities.

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Discussion

Lieut.-Colonel H. Greenfield (the President) who opened the discussion, said that one was bound to be apprehensive when one considered modern intensive methods of feeding, and conditions, because it seemed inevitable that as a result directly or indirectly, pathological conditions were likely to arise. "We do (he continued) know many of the ill effects. Many farm animals have come to be highly developed machines. Perhaps when we know more on diet digestibility such conditions as follicular mange and milk fever may ultimately be solved in the same way as osteoporosis and infertility due to deficiency. Apart from all that, there is the great untouched subject of food for sick animals. In canine diseases we have made some advance in this connection as evidenced by the administration of glucose and sugar in certain conditions; still our dietary for sick animals even in the case of our canine patients appears yet to be very indiscriminate, the same dietary being offered to patients suffering from a multitude of varying ailments affecting different organs. Surely there is some room for special study here."

Colonel Greenfield, proceeding, said that the thanks of the members were due to Professor Miller who had undertaken such a colossal task in his paper, and had got through it with great thought and originality—his observation that the ration fed to the highly developed modern cow might kill a wild cow was an interesting one. The essayist had made some interesting remarks in connection with parasitism—were parasites the cause or the effect of pathological conditions? He (Colonel Greenfield) had, whilst in the Army, been interested in bowel parasites. It was difficult to say whether pathological conditions had a great deal to do with high egg counts since he noted that animals in good condition might have enormous egg counts. The essayist's remarks seemed striking when he mentioned that the more artificial the food the more noticeable were its harmful effects upon the animal.

He would like to ask Professor Miller why a high protein diet should be so essential to an animal producing wool. He desired also to raise a point in connection with milk fever. Could Professor Miller tell him if there was any appreciable fall in the incidence of milk fever, which we were given to understand was a calcium deficiency, in herds fed over a period of time on highly scientific balanced rations (with adequate minerals) as compared with herds not scientifically fed?

Mr. H. Bell, after referring to parasitism and under-nourishment, said that he had encountered cases while carrying out the tuberculin test, in which a cow might pass several tests and suddenly for no obvious reason would react. These cows were very frequently very heavy yielding animals. The feeding might be apparently adequate, but for some reason the vitality was lowered; might it be that the feeding was actually inadequate to enable the cow to maintain her resistance? Regarding the remarks on hay, did the speaker mean to suggest that if a sample of hay looked sound and good, it might still be inferior to a second sample which had not such a good general appearance?

Mr. J. W. McIntosh, having thanked Professor Miller for his very interesting and instructive paper, said that he had really nothing he could add. He was convinced that no single factor produced more disease amongst stock than faulty feeding. Many stock owners fed their animals with as little discretion as they fed themselves. The main principle to remember was that a properly balanced ration was essential. His experience had been confined almost entirely to the horse, at any rate for the past 30 years, and in his opinion the feeding of horses left many difficulties to overcome on account of the varied uses to which a horse might be put—feeding which would suit a horse performing a particular class of work might be quite unsuitable for a horse being used for some other work. The quality of the ingredients used was of the very highest importance. Mr. McIntosh, in again thanking Professor Miller, expressed the hope that he would carry on his good work on a subject which was all important and one which, until recent years, had been very much neglected by the profession.

Mr. G. P. Male observed that Professor Miller had covered so much ground that it was difficult to know what to criticise.

On the question of hay, he did not think that Professor Miller had made it clear what his views were on the feeding of hay. He (Mr. Male) agreed that the feeding of bad hay, just as that of bad beef, or bad bread, was not good, but he was always an advocate of good hay. Some people were of the opinion that the feeding of hay could bring about ill effects, such, for example, as constipation. In Mr. Male's opinion not only was it a good food but it also acted in a mechanical way upon the bowels, stimulating peristalsis. He remembered when he was a student having an experience in connection with a stud of Shire horses where a number died. On *post-mortem* examination very severe impaction of the colon with bran and chaff was found. When long hay was fed this condition ceased. With regard to bad hay, everybody was familiar with the ill effects produced by feeding it—for instance, diuresis following the feeding of mouldy hay. He was a firm advocate of hay especially in cows which often, in his opinion, received too much highly concentrated food, and not enough hay. He believed in actually chewing stems of hay to ascertain its quality, in which way one could detect the sour type which came from low-lying damp meadows, or the sweet nutty flavoured coming from upland fields. Some bad hay carried few seeds; other samples carried a lot of seed and the feeding of such made it possible to cut down the ration of oats by half. Mr. Male said that clover hay and that rich in legumes was often responsible for azoturia owing to the undigested protein.

Professor Miller had asked the practitioners' views on parasitism and pathological effects. Mr. Male was of the opinion that in most cases it was the size of the dose of larvae which was the important point. Foals could look well though heavily infested with worms and yet in a few days death might occur due to parasitic enteritis and toxaemia. As in the case of poisons, human beings and animals might stand repeated small doses over a long period yet the administration of a big dose might bring about death.

He thought the pathology of pregnancy toxaemia and milk fever had not yet been fully elucidated. In the latter disease one could feed calcium and administer large doses after calving yet the cow contracted the disease. There were other factors which contributed to this condition.

Mr. E. J. Heather said that he would like to ask Professor Miller a question on a subject which, though not touched upon in the paper, was of great importance to him. Had Professor Miller any definite information on any method of nutrition whereby young growing horses could be induced to attain a size larger than that which they would have attained otherwise. Some years ago, in the very same building now occupied by the meeting, he had detailed some work which he carried out in connection with the administration of iodine to young thoroughbreds. In that case he was simply making good something which was deficient. The question which he was now asking was related to a different matter. Where animals were being reared in the best way possible, could not something be introduced to bring about an increase in their stature? Mr. Heather related how a client of his had divided a litter of six pups at seven weeks old into two. One half the client kept at home and the other half was sent away into the country to a farm. The three animals kept at home were in poor surroundings—small space, damp run, etc. Rations were generally of poor quality with the exception that some dried milk products were added. The other half were reared in much better surroundings in the country. Yet when Mr. Heather saw them at six months old, despite the fact that the home lot had been suffering from distemper, they were higher by two inches than the others in the country. The Irish had a theory that young animals should not be too well done and that no attempt should be made to get rid of worms. This procedure seemed to answer if one was to judge by racing greyhounds bred in Ireland.

Another point raised by Mr. Heather was whether thoroughbreds bred to stay a mile and a half and which "shut up" at four furlongs were not probably deficient in minerals. He had treated racing greyhounds seized with some kind of cramp on the track with calcium injections, apparently with good effect. Was this another case of mineral deficiency? With regard to questions of parasitism, he had not noticed any connection between diet and the incidence of parasitism. One saw overfed spaniels heavily infested with parasites apparently producing no ill effect, whilst other dogs, under-nourished, seemed to be free. He agreed that too much cod liver oil could lead to a lot of troubles. Clients sometimes said to him, "These calves are having four ounces of cod liver oil, why don't they thrive?"

Veterinary Lieut.-Colonel G. Rees-Mogg thanked Professor Miller for his very interesting paper and expressed special interest in his remarks on the analysis of hay samples. How should he expect a sample of Canadian Timothy to

compare with a sample of English meadow hay with its admixture of buttercups and daisies and other weeds. Also, with regard to samples of bran, on one occasion some of his men complained about a sample which they stated was like saw-dust as compared with another sample which was flaky, so he therefore sent the two samples to be analysed and the report was to the effect that the sample which was like saw-dust was every bit as good as the other. On one occasion he had sent a sample of dried grass to be analysed and was told that 25 per cent of the sample was dirt, and the proteids and minerals were far below the standard which was claimed for them.

Colonel Rees-Mogg also referred to the ravages which were supposed to be brought about by red-worms in horses. He described how on one occasion he had subjected nine horses to stomach tube treatment for red-worms. In one case the stomach tube could not be passed because the horse was so refractory. After about three months (all the animals were weighed periodically) he found that the horse which had not received any treatment was in better condition than the other eight which had been treated and had, in addition, put on more weight than any of the others.

Mr. L. G. Anderson said that he was interested in Professor Miller's remarks on the administration of calcium to calves with a view to preventing milk-fever. He should, however, like to ask one question. His experience of milk fever in practice was that nine out of ten cows affected were animals in fat condition; he also very often encountered the condition in cows which had been dry for a long time. In fact, his experience of milk fever was that it often seemed to appear in animals which had had the best chance of conserving calcium. With regard to parasitism and general condition, could not it be due to poor conditions rather than poor feeding?

The Reply

Professor Miller, replying to the points raised in the discussion, said that in answer to the President's remarks, he quite agreed that there was a large and comparatively untouched field to be surveyed relating to sick feeding of farm animals. He thought that practitioners could themselves contribute more useful information in this field than could those who worked in central institutes, colleges, etc., because of the greater opportunities.

Referring to parasitism, he thought it would be interesting to know how the numbers of parasites were assessed. The faecal egg-count technique though of some general use was, he understood, condemned by parasitologists as an unreliable index of the numbers of worms present and of the degree of parasitism in an animal.

In answer to the question why was a high protein content in food necessary for wool production, he could best illustrate the reason by saying that wool was something of the nature of a luxury product. When deficiencies occurred, the wool was the first structure to suffer. Wool production made big demands on the system for cystine (and possibly threonine), which was only present in proteins of high biological value. Actually, wool quality was also related to mineral intakes—both calcium and phosphorus were of importance in wool growth. In some of the phosphorus-deficient areas of South Africa and Australia, some of the finest (*i.e.*, with smallest fibre-diameter) wool in the world was produced from sheep that were, strictly-speaking, in subnormal health.

The question relating to the importance of high mineral intakes for dairy cows in relation to the incidence of milk fever was extremely difficult to answer. If adequate balanced mineral feeding was not commenced until late in pregnancy, it could have but little effect.

[Here Major R. C. G. Hancock asked if he might be allowed to cite an experience he had in connection with calcium deficiency. In a small private herd of Jerseys of which his father and later he himself had charge from 1914 onwards, the incidence of milk fever was phenomenal—in some years 100 per cent. of the milk cows. In the year 1931 the owner was advised to lime his land, which on analysis was found to be one-and-a-half tons to the acre deficient. The liming was done in the autumn of 1931. Milk fever had a 50 per cent. incidence in 1932. It was not until the limed hay crop of 1932 had been in use for some months during 1933 that the milk fever cases practically ceased, and it was noted that the extreme severity of the cases which had been usual was much diminished.

The lapse of time after the liming before the incidence drop was interesting, and suggested that there must be a development in the limed grasses of some anti-milk fever substance, which was not present in lime-deficient herbage and which permitted of ultimate lime storage in the body of the cow.

The members thanked Major Hancock for his observations.]

Professor Miller, continuing, thanked Mr. McIntosh for his remarks, and said that he was glad to hear him agree that hay quality was of far greater importance than one often realised. He would like to make more clear the observations he had made referring to analyses of samples of hay. He would thereby be answering several other gentlemen. He had meant to say that external appearance could not be any criterion of nutritive value. He asked them to assume that one had two samples to judge. One, having been "well-gotten," might have a good, clean, sweet, nutty smell, a bright fresh appearance, and be passed as of superior quality, yet it might have been grown on poor sandy or stony soil. Now assume an averagely-harvested sample grown on deep, black, fertile soil, rich in minerals, humus and so on. It might be passed over in preference for a sample of poor quality which looked and smelt better, being better "saved." On analysis, and on feeding, the sample of only average appearance, might be far superior to the former. Only an acquaintance with the composition of the hay could give a real guide to its value. It was notoriously difficult to decide which of two samples of equally good appearance, which might have a similar price, should be chosen. Here again, analysis would greatly help. He thought they would get some surprises if they could persuade clients to make more use of hay analyses.

In answer to Mr. Bell, it was exceedingly difficult to reach a conclusion regarding any specific instance. The cow mentioned might possibly have been on a diet theoretically adequate, but actually not so. Subnormal levels of feeding did have an adverse cumulative effect upon disease resistance, but the crux of the case instanced was, from where did the infection come and what was its magnitude. It was quite a common complaint that the very heavy

producing cow was usually the one which suffered first and most, but this was of course not an invariable rule. He thought perhaps he had dealt with Mr. Bell's query relating to hay. Referring to Mr. Male's comments on hay, he (Mr. Male) had gone a good way towards conducting his own analysis by chewing the stems before deciding on a sample. Perhaps more should follow Mr. Male's example. His observations on parasitism were very much to the point, but even after accepting all that he had said, it was still possible to believe on evidence that the adequacy of a feeding regime did play an important part in warding off clinical effects of parasites.

In relation to milk fever, pregnancy toxaemia, and azoturia, he thought that, in spite of all the work which had been done on these diseases, there was still much to be explained before they could rest quite satisfied. The weather had a profound influence upon respiration, heart beat, and metabolism and might readily contribute to the production of these diseases. He thought that this was especially so in the case of pregnancy toxaemia.

In answer to Mr. Heather's question regarding factors influencing stature—the position seemed to him to be that no animal, horse or otherwise, could grow beyond its genetic limit. A capacity to grow to a certain maximum size was normally inherited. By bad management, feeding, etc., an animal might never attain that maximum. By good feeding and management it might reach its maximum potential size more quickly, but he knew of no evidence to show that one could induce a greater ultimate growth by any method, provided the horse remained normal. It might be possible to produce a degree of gigantism by growth hormones, but that was dangerous. It was difficult to explain why, in the instance mentioned, the three pups under poor conditions were two inches taller than those which had been kept under good conditions at six months of age. It would be interesting to know what were the respective sizes when the dogs were adult.

With reference to the thoroughbreds in training, which "drew up" at half distance or less, he thought Mr. Heather would probably know that there was now a considerable use of sugar for the same condition (or one very similar) in human athletes. A dose of a readily absorbable sugar by the mouth was found to ward off muscular fatigue and prolong staying power. There were quite sound physiological reasons, and it was largely used. He thought the Ca injections might act in two ways, especially if the gluconate had been used. The gluconate fraction would act as a sugar and the Ca would increase neuro-muscular irritability (temporarily at least) and act as a stimulant to muscular action. Of the two, he thought more benefit would be derived from the sugar fraction. In connection with horses, he (Professor Miller) thought Mr. Heather should certainly give calcium injections (the boro-gluconate would probably be best) a trial. It would be interesting, and valuable, to have the results recorded in due course. He might also try feeding with two or three ounces daily of brown sugar during the training of such young horses.

The reference to cod liver oil opened up a big question. There were numerous very inferior brands on the market, usually but not always at a cheaper price. The best advice that could be given was to recommend the use of only those well known makes that carried a definite guarantee of vitamin potency—for both A and D—and contained low percentages of free fatty acids and non-saponifiable matter. Much work was in progress in various parts of the world on the risks of tissue injury being sustained by animals dosed with too large quantities or perhaps especially with inferior brands of cod liver oils. Caution was required, and an amount of four ounces per head per day for calves was far too much; two ounces daily of a guaranteed brand was quite adequate.

In reply to Colonel Rees-Mogg, Professor Miller said that it was difficult to speak precisely regarding general samples of Canadian Timothy. Some were very good, but other samples were very inferior. He quite agreed that much home-grown meadow hay was badly contaminated with weeds, and its food value was accordingly low. There was often a prejudice in many owners' minds in favour of meadow hay, no matter what its quality might be. He thought this was very unfortunate. Colonel Rees-Mogg's observations on the samples of bran were another instance of how misleading the general appearance of a foodstuff might be.

Mr. Anderson's remarks regarding milk fever served to illustrate still further the observation made earlier that there were still several details concerning this disease not yet fully understood. At the same time, he thought that the correlation of high incidence was more often with capacity of the udder to yield extra large quantities of milk, rather than with over-fatness or an abnormally long dry period. It might be that the cows which were in better condition had the more active udders, which put a greater demand upon the circulating blood calcium, and used it up quicker when they became functional after calving. This also would apply to those with a longer recuperative dry period.

In conclusion, Professor Miller thanked the members for their kind reception of his paper, and for bringing out many useful points in the discussion.

ELECTRICAL STUNNING OF CATTLE

On July 26th, 1938, at the Birmingham Abattoir, a demonstration was given of the Footner Electric Collar, a cattle electrical stunning instrument invented by W. E. Footner, Esq., M.R.C.V.S., Veterinary Officer in Charge of Meat Inspection at the Government Beef Export Abattoir, Durban, where the only method for stunning cattle is by this apparatus. The apparatus consists of a transformer, voltmeter, clock with second hand, warning red lamp, switch, cables and collar.

Six cattle were used in the demonstration and were all successfully stunned. On *post-mortem* examination it was seen that the carcases were well bled and subsequently set well.

A voltage of 180 was used and the current applied for 30 seconds by means of the collar, which is in the form of an inverted U, the terminals at the end of the collar resting in the jugular furrow. When the current was applied, the animal at once became rigid and gradually collapsed. The collar was then removed and the animal was drawn out of the pen and bled. In the sticking of the animals, none of them showed any sign of pain and there was an absence of movement of head or limbs, which indicated complete unconsciousness. A specially constructed wooden pen, with an iron floor, was used for this demonstration.

B. D.

Pathogenic Organisms and Fowl Paralysis

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Fowl paralysis is an obscure disease of poultry and wild birds symptomatised by lameness, drooping of the wings, torticollis, and blindness. One or more symptoms may be present in a single bird, and they may be vague, or cause the bird to become completely paralysed. Frequently the bird is emaciated. The symptoms may appear at any time from ten days onward, but usually six weeks or three months elapse before they are well defined.

The cause of the symptoms is not known. At *post-mortem* examination the brachial, sciatic, or other nerve trunks are found oedematously swollen and pink in colour. In mild cases no marked naked-eye changes are visible. Frequently tumours of lymphoid type are present in the splanchnic viscera, particularly the liver and ovary, and also over the mesentery. Frequently also the kidneys are found to be hyperaemic, or inflamed. This is particularly the case in young chicks of a few weeks old. Nephritis from chilling at hatching or subsequent exposure, faulty systems of feeding or management, causes young chicks to exhibit clinical symptoms of vertigo, torticollis, and lameness, in some cases ending in death. The great nerve trunks of such chicks are seldom markedly swollen, but inflammatory cells are found in them on histological examination.

True fowl paralysis occurs typically in pullets and adult birds, particularly those laying heavily. It is not common in cockerels.

It is held by some that a virus is the cause, whilst others consider a damaged bowel lining with subsequent toxaemia to be responsible.

The author supports the latter view. *post-mortem* and microscopical examination of a typical case of fowl paralysis almost invariably leads to the discovery of a parasitic infestation by worms or coccidia, or the damage done by parasites at one time present.

Where there are no parasites the kidneys are found acutely hyperaemic and inflamed. When nephritis occurs waste protein products are thrown back into the duodenum. The congestion of the upper third of the intestine found in nephritis in other animals, in the fowl is frequently represented by innumerable petechial haemorrhages spread along the duodenal loop.

Fowl paralysis is diagnosed when the nerves are found infiltrated with small round cells of lymphocytic character. Occasionally leucocytes are present.

The usual method of examination is by the naked-eye appearance, subsequently confirmed by fixing the nerve and examining it histologically.

K. D. Downham, Veterinary Officer to the West Midland Province, some years ago devised an alternative and simpler method, consisting of cutting out the affected nerve, squeezing its contents on to a sterile slide, and staining it by Leishman. This revealed whether any inflammatory cells were present in the perineural fluid, with much saving of time.

During the examination of a large number of nerves over a period of three years, the present writer was struck by the frequent appearance in such smears of coccoid bacilli, usually diplococcoid. Occasionally bacilli were present.

Accordingly some of the expressed fluid was taken up and smeared over nutrient agar. Small discrete white and green colonies of Gram positive and Gram negative cocci appeared in a number of cases. Subsequently the nerves of all birds entering the laboratory which on *post-mortem* examination were found parasitised were cultured.

Feathers were pulled out over the thigh and for some distance round, the skin was cleaned with alcohol, and then opened with a hot knife. A boiled, sterilised scalpel was then used to sever the muscles along the line of the femur, a second sterile scalpel being used to sever the last muscle fibres above the sciatic nerve.

A similar procedure was adopted for the brachial plexus.

The nerve was then picked up with sterile forceps, carefully freed with a second pair of forceps from the vessels accompanying it, and severed in two places with sterile scissors.

The section was then lifted on to a glass slide also present in the steriliser, the contents expressed with a third sterile scalpel, and picked up with a platinum loop and sown on nutrient agar slopes or plates.

During the month of June twelve such cases were examined, and resulted in eleven cases in the appearance on the slopes and plates of small discrete yellow and white colonies.

In one case a green influorescent growth was obtained, found to be due to a bacillus. These cultures were handed over to Dr. Camps, County Pathologist, Chelmsford, for determination. He reported them as colonies of *Streptococcus viridans*, and *Staphylococcus aureus*. The green pigment producing organism was *Bacillus pyocaneus*.

Attempts were then made to isolate such organisms from the accompanying blood vessels and the flesh, to ascertain whether they were contaminants. These attempts were unsuccessful.

It was suggestive that *Streptococcus viridans* and *Bacillus pyocaneus* were found in the nerves

of pullets suffering from a heavy duodenal and caecal coccidiosis. *Staphylococcus aureus* and *Streptococcus viridans* were found in the nerves of five birds suffering from duodenal and/or caecal coccidiosis, and in three birds with an infestation with the roundworm Ascaris.

Streptococcus viridans is suspected to be the cause of rheumatism in man. *Bacillus pyocaneus* sometimes occurs as a commensal in the intestinal flora of animals. On injection into laboratory animals it causes nephritis and petechial haemorrhages into the intestinal endothelium.

Staphylococcus aureus is responsible for many slow chronic suppurative conditions in man, animals, and birds.

In acute rheumatism in man the nerves first become oedematous, and then infiltrated with small round cells. The predisposing causes of rheumatism in man are wrongful feeding, particularly on a rich nitrogenous diet, and a sedentary life. An article submitted to the *Poultry Press* recently pointed out how often these conditions, frequently complicated by the insidious effects of chronic parasitism, were present in fowls, and suggested there might be an analogy between fowl paralysis and rheumatism in man. The appearance of these organisms in the nerves of affected birds appears to support this suggestion. Up to the time of going to press, only the three organisms described have appeared, in this order: *Streptococcus viridans*, *Staphylococcus aureus* and *Bacillus pyocaneus*. The last has so far appeared in one case only. It is suggested that these gained entry to the body during the slow destruction of the intestinal lining by parasites, particularly coccidia, or wrongful feeding, or feeding of rations of poor quality, over a relatively long period of time. The reason for the bacteria choosing the nerves as their predilection site is probably a problem for the biochemist; but the nephritis almost invariably present in such cases may also be due to their action.

Work is now proceeding on the possibilities of artificial infection of poultry.

The Shorthorn Society has again decided not to recognise the Polled Shorthorn for registration in the herd book. "This," says the *North British Agriculturist*, "is a difficult subject to settle in view of the progress that the Polled Shorthorn is apparently enjoying in other parts of the world."

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Forty-four thousand sheep in the Orkney Islands are in process of being dipped prior to export to the Scottish mainland markets. This is one of the biggest dippings in the islands since Orkney became a sheep-exporting county.

Notes Relating to the Camel

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The following notes relating to the one-humped camel have been obtained from experience with short-haired, light weight, Somali animals.

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Mange (*Sarcoptes cameli*).—Many prescriptions have been devised for the cure of camel mange, but most of them are sticky preparations which collect dirt and necessitate several applications. A better method is to remove the hair by clipping, and then after wetting, scrub the lesion with either a bundle of sticks or a soft stone to remove the scabs, after which an 11 per cent. solution of Crown Agents "White Fluid"* is applied. Two applications at intervals of eight days will be found to be sufficient to effect a cure in most cases. Even in severe cases the writer has observed no phenol poisoning.

This method is cheap, clean, easy to apply and effective.

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Injuries Caused by Canine Teeth.—Leese' in his excellent book "The One-Humped Camel," states that it is of advantage to blunt the canine teeth of rutting camels to prevent injury. It is very noticeable that camels, when not rutting, also inflict on each other long excoriations in the region of the flanks and other parts, and that these wounds frequently suppurate.

If, as a routine measure, all camels have the tips of the canine teeth removed many minor injuries will be avoided, and many camel working hours will be saved. The smooth quarter of a hoof rasp is an excellent instrument with which to round the canine teeth.

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Tick Paralysis.—A disease simulating tick paralysis in other animals has been observed in the camel by the writer, and it is interesting to note that the disease is associated in the mind of the native with the presence of ticks even if only found in small numbers.

Symptoms.—A sudden onset, with hyperaesthesia, stiffness in movement and a crouching gait. The camel frequently emits his frightened

* Crown Agents "White Fluid" is a fine homogeneous emulsion or solution containing tar acids and neutral hydrocarbons. It possesses a Rideal-Walker co-efficient of 18/20.

gurgling cry as though he were indignant and angry at his inability to control his limbs. Paralysis ensues in a few hours, and it usually commences in the hind limbs or the neck; if the former, the camel cannot rise, and if the latter pronounced torticollis occurs. No undue fever has been noted. The writer would not affirm that this disease is tick paralysis because no real proof is available, but he has observed that the early application of 1 per cent. Crown Agents "White Fluid," which is an excellent tick remover, to the entire body, will frequently effect a cure. If no treatment is undertaken a considerable mortality ensues and this mortality is not necessarily associated with trypanosomiasis.

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Traumatic Keratitis.—The prominent eye of the camel is very subject to severe injuries when grazing amongst thorn bush, and if the eye is not properly treated blindness or permanent blemish is likely to occur.

An effective method of treatment consists in first bathing the cornea with a 1 : 1,000 solution of acriflavine. This application incidentally enables one to see the exact extent of the injury as the lesion stains more deeply than the healthy tissue. After this a few drops of atropine sulphate (1 per cent.) are then inserted into the conjunctival sac. The eye is then covered by a thick pack of antiphlogistine which is wrapped in oiled silk to prevent its sticking to the eyelids and so causing irritation and blinking. No difficulty will be experienced in keeping the pack in place if a 3 in. elastocrepe bandage is used for this purpose. In view of the fact that they can be washed frequently and used again, the writer has found this type of bandage to be not only the most excellent for staying in place, but also the cheapest that he has tried.

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Trichostrongylosis of Camels.—Leese, in referring to trichostrongylosis in Egyptian camels, states that the disease is of "no practical importance to the camel doctor." However, the following case tends to show that trichostrongylosis may cause severe debility in the camel.

The patient when first seen was very anaemic and debilitated and, in addition, he had a high faecal egg count. Trichostrongylosis not being suspected, one pint of 1 per cent. copper sulphate was given, but there was no improvement. Subsequently an empirical drench of oil of chenopodium (15 ml.), oil of turpentine (30 ml.) and 640 ml. of mineral oil was given, but it was equally ineffective. On careful *post-mortem* examination a heavy infestation of the small intestine with both *Trichostrongylus probuluris* and *T. colubriformis* was seen.

As a Bennett's mercuric chloride test for trypanosomes was negative, and as it showed no signs of disease other than those of verminous debility, it cannot reasonably be doubted that the patient was affected with a pure trichostrongyle infection. The only other helminths seen were a few *Trichuris* sp.

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Ringworm in Camels.—Ringworm, so far as the writer is aware, has not been recorded in the camel, and so it is worth while mentioning that a typical ringworm is frequently observed in young calf camels, in Somaliland, affecting chiefly the hairy sides and the neck. The causal agent has been fully described by Sir Aldo Castellani, and is named by him *Trichophyton dankaliense*. It also is found affecting man in Abyssinia.

Removal of the scabs and the application of a 5 per cent. solution of Crown Agents "White Fluid" every three or four days readily effects a cure.

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The Haemoglobin Content of Camel's Blood.—No satisfactory figures are available which show the haemoglobin content of camels' blood and the following note is intended to supply this need.

Light-weight Arabian camels, long domiciled in Somaliland, were used in the experiment and they were found to be negative to Bennett's test for trypanosomiasis.

A "Neoplan" haemoglobinometer having a glass colour scale was used as it was more reliable than the common colour standards, which deteriorate in the tropics. The instrument, which is intended for human use, gives a reading in which 14 grammes of oxyhaemoglobin are recorded as 100 per cent.

After numerous trials had been made in order to obtain efficiency it was found that a 4 per cent. ± visual error was possible when taking a reading, but that a 3 per cent. ± error was probably a more correct estimation of error. Several readings were taken from each prepared blood sample and an average was thus obtained. The blood used was taken from the jugular vein.

Though the camels were healthy, receiving adequate salt, and trypanosome-free, it should be mentioned that they lacked a little bloom, and this, no doubt, was due to the poor camel grazing in the neighbourhood. When sent to better grazing, which included much "salt bush" (*Salvadora indica*), they recovered their lost bloom, but no appreciable alteration in their Hb per cent. occurred.

The figures obtained were as follows :—

November ... 1937.	11th.	12th.	13th.	14th.	15th.	16th.	17th.	18th.	19th.	20th.	*Average.*
Camel Number.											
586	59	59	50	60	55	52	50	56	53	55	54
563	60	60	52	60	61	59	57	53	55	55	57
564	59	51	52	55	60	56	55	50	55	55	54
460	64	61	62	66	62	63	75*	63	65	66	64
371	59	52	57	60	57	56	58	56	55	60	57
475	55	50	52	56	53	58	54	53	55	54	54
507	52	50	50	52	62	xx	52	50	50	52	52
605	53	51	54	53	55	53	52	51	54	51	52
506	57	51	51	57	57	54	50	50	55	50	53
203	59	61	60	55	52	60	60	52	56	58	57

* Re-checked. General average 55·28.

In the following table the above figures are expressed in grammes of oxyhaemoglobin per 100 ml. of blood.

November ... 1937.	11th.	12th.	13th.	14th.	15th.	16th.	17th.	18th.	19th.	20th.	*Average.*
Camel Number.											
586	8·3	8·3	7·0	8·4	7·7	7·3	7·0	7·8	7·4	7·7	7·6
563	8·4	8·4	7·3	8·4	8·5	8·3	8·0	7·4	7·7	7·7	8·0
564	8·3	7·1	7·3	7·7	8·4	7·8	7·7	7·0	7·7	7·7	7·6
460	8·9	8·5	8·7	9·2	8·7	8·8	10·5*	8·8	9·1	9·2	9·0
371	8·3	7·3	8·0	8·4	8·0	7·8	8·1	7·8	7·7	8·4	8·0
475	7·7	7·0	7·3	7·8	7·4	8·1	7·6	7·4	7·7	7·6	7·6
507	7·3	7·0	7·0	7·3	8·7	—	7·3	7·0	7·0	7·3	7·3
605	7·4	7·1	7·6	7·4	7·7	7·4	7·3	7·1	7·6	7·1	7·3
506	8·0	7·1	7·1	8·0	8·0	7·6	7·0	7·0	7·7	7·0	7·4
203	8·3	8·5	8·4	7·7	7·3	8·4	8·4	7·3	7·8	8·1	8·0

* Re-checked. General average 7·7.

The condition of the above camels calls for some comment :—

Camel Number.	*Condition.*
586	Good.
563	Good.
564	Fair.
460	Good and having a very large hump.
371	Good. Naganol injection 30.6.37.
475	Good.
507	Fair. Naganol injection 9.10.37.
605	Good.
506	Good.
203	Fair. Naganol injection 9.10.37.

Foot-and-mouth disease is spreading in South Africa, farmers' herds have been destroyed as well as the cattle of the Zulus, their most prized possession. It was feared that, unable to understand the reason for the Government's order to destroy their herds, they would resist, but the position was explained by the Zulu Regent.

Livestock in U.S.S.R.—The results of the All-Union census of livestock taken on January 1st, 1938, have now been published in the Soviet Press. On that date the number of big horned cattle throughout the Union was 50·9 million—an increase of 7·2 per cent. over the figure for January, 1937, which was 47·5 million. Included in the figure of 50·9 million head of big horned cattle are 22·7 million cows, an increase of 8·3 per cent. over the previous year. The number of sheep and goats on January 1st, 1938, was 66·6 million head, as against 53·8 million, representing an increase of 23·8 per cent on the year. The increase in the number of sheep during 1937 as compared with 1936 was 10·7 million. The number of pigs on January 1st, 1938, was 25·7 million, showing an increase of 28·3 per cent. over the 1937 figure; and the number of horses was 16·2 million, an increase of 2·1 per cent. over the 1937 figure. The aggregate increase of all kinds of livestock in 1937 as shown by the recent census was 22·3 million head.—*Scottish Farmer.*

* * * * *

Advice to farmers to set about breeding a smaller animal which would command a better price and compete with the imported article, instead of blaming importers for the reduced demand for home produced lamb, is given by Mr. H. Rigby in the current issue of the *Farmers' Weekly.*

The Veterinary Record
August 13th, 1938.

Parliamentary Debate and Animal Disease

READERS of our columns headed "In Parliament" will have noticed of late a much more frequent reference to diseases of animals and allied problems in the debates of both Houses of Parliament. To us this is gratifying, for with the resulting publicity given to these debates the public learns to appreciate the work of the veterinary profession to an ever-increasing extent. Before long we may expect even our urban populations to realise that the veterinarian performs important functions in connection with the rearing and maintenance in health of all animals and is not solely concerned with the welfare of the smalier domestic pets. A growing consciousness on the part of the public of the duties of the profession in connection with human health may also be expected and should lead to the creation of an improved system of meat inspection in the country.

A most pleasing feature of the recent Parliamentary debates is the increased accuracy of the statements made and the improved knowledge on these subjects shown by individual speakers. It is evident that Members of Parliament are anxious to learn more of the work of our profession and that they are increasingly looking to us for advice upon those problems which most intimately concern us. Those veterinarians whose privilege it has been to meet Members from both Houses of Parliament and discuss with them from time to time the clauses of Bills connected with one or other aspect of the work of the profession have been impressed by the keen desire of our legislators to learn from us the scientific views on these subjects. Such informal meetings as these benefit both Parliament and the profession and they lay upon our representatives heavy responsibilities to ensure that such information or advice as they may be able to give shall be well informed and in keeping with the views of our Association.

CLINICAL COMMUNICATIONS

Gastric Neoplasm

HAMILTON KIRK, M.R.C.V.S.

Tumours in the stomachs of dogs are distinctly rare, thus it is of interest to record such a case, with especial reference to radiographical diagnosis.

An eight-year-old chow was first examined about six weeks ago* in consequence of emaciation and vomiting, conditions which were said to have set in rather suddenly some two weeks before. The extreme nervousness of the dog precluded easy handling and militated against thorough examination. The clinical picture, however, was suggestive of nephritis except that the quantity of urine passed was not materially altered. The first procedure therefore was to collect specimens of urine and faeces and submit them to a pathologist. The report was to the effect that there was not only albuminuria, suggestive of nephritis, but glycosuria, indicating diabetes. Also that eggs of worms were found in fair abundance. (No adult worms had ever been observed.)

The pathologist suggested vermicides, and failing an improvement thereafter, thought insulin would have to be resorted to.

The owner, in common with myself, was frankly incredulous, but wrote asking that some kind of treatment should be instituted to stop the emesis. I posted a quantity of opium pills, the use of which was reported to have done much good.

But the weeks went by, the dog absolutely refused to eat and any liquid aliment—forcibly administered—was soon rejected. Emaciation became extreme, the weight having been reduced to 23 lb.

At this stage I suggested an X-ray examination as a preliminary to which 1 gr. of morphine was injected. An ordinary radiograph revealed no abnormality. An attempt was then made to introduce an opaque meal, but the dog resolutely refused to swallow a drop of it. Eventually a stomach tube was passed, and 2 ozs. of barium emulsion were poured into the stomach. A radiograph taken five minutes later showed a considerable length of small intestine already filled with barium, a fact which appeared to exclude pyloric stenosis from the diagnosis. The stomach shadow was small (the organ being empty of food) and showed an irregularly indented superior border; but one could not definitely conclude that this was of pathological significance. X-rays therefore revealed nothing of tangible value other than disproving pyloric stenosis.

*Received for publication July 2nd, 1938.

The narcosis permitted a closer examination of the abdomen and I was able to detect a small hard insensitive body immediately above the ensiform cartilage, and only slightly movable. This was sufficient evidence to justify an exploratory laparotomy, when it was at once discovered that the stomach was the seat of neoplastic growth. The dog was destroyed and Mr. White (Pathologist, Royal Veterinary College) kindly furnished a *post-mortem* report that the stomach walls were from ½ to 1 inch in thickness, due to mucoid sarcoma. The cardia was also affected but not the pylorus. He did not find a single worm nor could he detect glycosuria by any of his tests. He gave me to understand that mucoid sarcoma was exceedingly rare in the dog, only one case having previously been recorded.

The lessons to be learned from this case are that the symptoms arising from neoplasm of the stomach may appear suddenly instead of insidiously; that although icterus is generally an associated symptom in man, it may not be present in dogs; that radiography cannot be relied upon in all cases to reveal gastric neoplasm; and that in spite of the conflicting reports of the pathologists, both glycosuria and albuminuria may exist without indicating involvement of either pancreas or kidney.

It might be added that the kidneys in this dog were normal, and that the pancreas seemed little altered except for the presence at one end of it of a walnut-sized growth which could not have affected the output of hormone from the healthy remainder of the gland.

* * * * *

Laceration of a Cow's Teat

J. P. ALLEN POTTS, M.R.C.V.S.,
SHREWSBURY

Subject.—A cross-bred dairy cow in full milk.

History.—I received an urgent message to see a cow with a lacerated udder. The cow had jumped through a hedge and caught her udder on some barbed wire. The injury was noticed only when the cows were brought in at night for milking, and had in all probability been present for two to three hours.

Examination.—The left hind teat of the cow was found to be torn, the wound was ragged and approximately 3½ inches in length, stretching nearly the whole length of the teat. The teat canal was open in the centre of the wound and the milk was running out.

Prognosis.—Unfavourable. Amputation of the teat was considered, but it was decided to attempt to save the teat and quarter.

Treatment.—Epidural anaesthesia was induced, the cow being given 5 c.c. of chlorocain.

The whole udder was washed with a warm solution of a proprietary non-poisonous antiseptic. The wound was cleansed and some of the antiseptic applied neat, after an antiseptic teat bougie had been inserted, to stop flow of milk. The mucous membrane of the teat canal was sutured with six interrupted sutures of fine catgut. The external wound was closed with 12 interrupted sutures of ligature silk. The whole teat was then dressed with carbolised liquid paraffin (5 per cent.).

The quarter still contained a considerable amount of milk and this was drawn off with a sterilised silver teat syphon. As a precautionary measure 6 c.c. of a polyvalent mastitis vaccine was injected subcutaneously.

The owner was instructed to insert an antiseptic bougie after each milking, and to prevent strain on the sutures. He was also shown how to use the milk syphon aseptically.

The teat was dressed twice each day with carbolised liquid paraffin, and the cow kept in a scrupulously clean stall with no bedding.

Sequelae.—The cow unfortunately developed a slight mastitis in the quarter which was troublesome and retarded healing. However, with hot fomentations three times a day to the quarter and a further three injections of 5 c.c. of the mastitis vaccine every other day, the mastitis cleared and the milk became normal in eight days. While mastitis was still evidenced the milk was drawn from the quarter every third hour by means of the teat syphon.

Healing of the wound occurred by first intention except for a small portion at the end of the teat which healed by granulation. The external sutures were removed after 12 days and the quarter milked out by hand. Healing was perfect, no fistula resulted, and in 21 days, except for a small scar at the site of granulation, the teat was normal and the quarter healthy.

HOMING INSTINCT OF PIGEONS

The Rennes Correspondent of *The Times* reports that a phenomenon which may serve to throw some light on the mystery of the homing instinct in pigeons is being discussed by fanciers in that region.

"Some months ago," he observes, "a large dump of scrap iron, 150 yards long by 60 yards wide, was formed at Le Pellerin, near Nantes. Since then on 19 different occasions—the last being two or three days ago—the watchman, M. Edmond Collier, has found homing pigeons on the dump apparently dazed and at a loss for their bearings. He has noticed that these pigeons are unable to resume their flight with any confidence until they are taken a considerable distance from the dump. One theory which seems to be worth investigation is that some form of electro-magnetic sensibility provides the birds with their uncanny ability to fly long distances back to their lofts, and that a large mass of metal such as this throws the faculty out of gear."

ABSTRACTS

[**Losses of New-born Calves Presumably the Result of Feeding Dams Rations Inadequate for Reproduction.** Sampson, J., Boley, L. E., & Graham, R. (1938.) *Cornell Vet.* **28.** 1. 52-57.]

The loss of 84 new-born calves in a herd of cattle under conditions which suggest a nutritional deficiency in the diet of the dams is described. Prior to the outbreak the diet of the cows consisted of wheat straw and yellow ear corn, or oat straw and yellow shelled corn. The calves at birth appeared to be in fairly good condition. Nearly all were able to suck shortly after birth. Definite symptoms usually appeared five to six hours later. Calves became so weak that they were unable to stand and profuse diarrhoea developed. There was complete anorexia but no rise in temperature. Death usually occurred within 24 hours after the onset of symptoms. *Post-mortem* examinations revealed no specific bacterial or other cause. There was a suggestion that the vitamin A content of the liver was sub-normal. A change in the diet of the dams to clover hay, shelled corn and oats plus a mineral supplement effectively reduced further losses after about three weeks. [Although the authors do not state any opinion as to the cause of the losses or what factor in the altered diet checked the losses, it seems probable that the trouble was due to an inadequate vitamin A intake in the original diet.]

N. J. S.

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[**Further Studies on Rickets and Osteomalacia.** (Trans. title.) Marek, Wellmann and Urbanyi. (1938.) *Arch. wiss. prakt. Tierhlk.* **73.** 1. 32-39.]

A prolonged drought during the summer of 1935, leading to poor feeding during the winter, was responsible for a high incidence of rickets and osteomalacia amongst cattle in Hungary during the following spring. From 80 cows slaughtered for this reason the following case was selected for examination:—

Heifer, seven months' pregnant. Clinical picture: Bent back, spread-eagled limbs with bent elbows, uncertain gait, difficulty in rising. Urine free from abnormal constituents. Serum Ca, 10·4 mg. per cent.; inorganic P, 3·38 mg. per cent. Diet largely turnips, wheat straw and maize straw. Macroscopic and microscopic examination of the rib-bones confirmed the diagnosis of rachitic and osteoporotic osteomalacia. The bones of the foetus appeared perfectly normal.

A femur from the cow was analysed and compared with that of a normal animal of similar age. [It is not stated whether this animal was pregnant.] The rachitic bone was much lighter than normal and was markedly deficient in CaO, MgO and P_2O_5. Analysing their figures the authors concluded that the condition was caused by a low-phosphate diet. This was confirmed by analysis of the diet which not only was grossly deficient in P but also showed a very high Ca/P ratio.

A. R.

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[**Fowl Paralysis: Investigations.** (Trans. title.) Fritzsche, K. (1937.) *Zschr. Infektr. Haust.* **52.** pp. 51-69.]

Following a general introduction, a brief resumé of the literature is given wherein the conclusions of the various authors are recorded. Fritzsche refers particularly to the work of Seagar (1934) who reported the discovery of an infective agent in faeces of affected birds. Fritzsche's work is largely an extension of this.

His material consisted of the faeces of selected birds from a flock in which fowl paralysis (F.P.) had been endemic for at least three years. *Post-mortem* and histological examination of these birds showed them to be typical cases of the disease.

The material was pooled, mixed with physiological saline to the consistence of thick broth and filtered, first through a Kieselguhr and then through a Seitz filter, finally being tested for sterility before use. The experimental chicks were all obtained as day-olds from a clean source and kept under the same system of feeding and management during the experimental period.

Experiment 1.—Fourteen ten-day old chicks were inoculated subdurally with 0·2 c.c. of filtrate. One showed clinical symptoms in 44 days and when the experiment was terminated at the end of nine months, three showed histological changes indicating infection.

Experiment 2.—Thirteen ten-day old chicks were inoculated intramuscularly with 0·4 c.c. of filtrate. One showed clinical symptoms in five months and there were histological changes in two others.

Experiment 3.—The freshly made filtrate from the faeces of four birds was mixed with the food of 27 ten-day-old chicks for 14 days. In eight weeks one showed clinical symptoms with a pale-grey, fixed iris. Six others showed histological lesions.

Experiment 4.—This consisted of the observations made on the control group of 20. One bird developed a "slant" iris at six weeks of age but did not lose the power of accommodation and one was killed with "catarrhal enteritis." No clinical or histological evidence of F.P. was found and the original stock has remained healthy up to the time of writing.

The histological changes referred to were in the nature of cell infiltrations, usually perivascular, either in the brain, spinal cord or limb

nerves. In order to justify his diagnosis upon these grounds, Fritzsche examined similar material from 50 birds which had died from various causes. Sparse infiltrations were found in seven. [Many good photomicrographs are included.]

In reviewing his results, Fritzsche considers that the infective agent present is of very low virulence, probably a virus. When considering infectivity he regards the constitution and state of health at the time of exposure to infection as important factors. Control measures are directed towards the protection of the young stock from faecal contamination from the older stock. Complete isolation of the breeding unit is advised or at least this should be dealt with each day before the older birds. Rigorous culling and purchasing from reliable sources are also advocated.

N. S. B.

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[Control of Foot-and-Mouth Disease in Germany, Denmark and Holland. (Trans. title.) Cernovsky, J. (1938.) *Prag. tierärztl. Archiv.* **18.** 3. 49-60.]

In Germany infected premises are dealt with by the immunisation of adult cattle by the use of hyperimmune serum manufactured on the island of Riems and virus from infected animals which is rubbed into the buccal pad. Calves under six months old, small ruminants and swine are given protective inoculation with serum alone. Other stock on neighbouring premises which are considered to be in danger are given a protective serum inoculation. The premises are strictly isolated and stock movements controlled, but the police measures are not detailed in this article.

Although the Riems laboratory maintains 900 cattle for serum production, the serum was insufficient to meet the requirements of the 1937-38 epizootic, and in addition to hyperimmune serum, serum from animals which had recovered from the disease four weeks previously was used satisfactorily in doses of about 400 c.c. In spite of these control measures the spread of disease was not prevented, and it is believed that it has been principally due to the carriage of virus by human beings, the movement of meat from animals slaughtered in emergency and the fact that a certain percentage of recovered, or immunised animals may harbour the virus for a year. In some cases outbreaks of disease followed on the movement of apparently healthy cattle from districts in which no disease existed to areas which were free from disease. No evidence could be obtained that the disease was carried by birds.

In Denmark routine control had consisted of the slaughter and burial of susceptible animals on infected premises, with the stopping of all movement within a radius of two miles. The farmer was not allowed to restock infected premises till six weeks after slaughter and disinfection. In areas in which the disease became very prevalent this policy had to be abandoned, and replaced by the use of the serum made from recovered animals, given rather with the object of reducing losses than to prevent infection. In Denmark it is also believed that a percentage of recovered animals may harbour the virus for a year or more. Research has been directed to the manufacture of a vaccine by exposing virus to the action of aluminium hydroxide. This vaccine has only proved of value in large doses, and such doses have produced undesirable reactions.

In Holland it has not proved possible to prevent spread of the disease owing to the concentration of cattle along the canals. Efforts have been concentrated on immunisation which has been produced by inoculation with serum from recovered animals and a dilution of culture virus. This method has not been considered satisfactory in view of the large dose of serum which had to be used. Recently satisfactory results have been obtained on a small scale by inoculating culture virus alone into the mucous membrane of the tongue at a dilution of 1 : 5,000 or 1 : 10,000. In Holland it is not accepted that recovered animals harbour the virus.

U. F. R.

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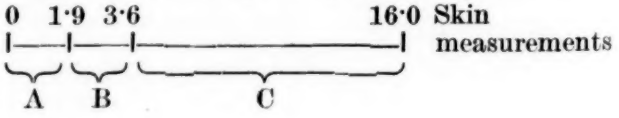
[Tuberculin Studies from the Point of View of Veterinary Practice. (Trans. title.) 1—6. Russeff, C., and Henniger, E. 1 and 3; Russeff, C. 2, 3, 5 and 6. (1937.) *Zschr. Infektr. Haust.* **51.** 2 and 3.]

(1) Cross allergic experiments on 178 guinea-pigs between tuberculin and abortin showed that both synthetic (Dorset's) tuberculin and 5 per cent. glycerine bouillon (old) tuberculin produced a slight non-specific reaction on guinea-pigs infected with *Brucella abortus.* Tuberculous guinea-pigs gave a slightly greater non-specific reaction to abortin. Dorset's tuberculin produced a greater specific reaction than old tuberculin.

(2) A new method of estimating the potency of an unknown tuberculin is described, depending upon the specific, non-specific and normal reactions produced in guinea-pigs. The value of the tuberculin is expressed as a three-part reaction, namely, its normal (*a*), pure non-specific (*b*), and pure specific reaction (*c*).



(3) Human, bovine and avian strains were cultivated on Dorset's, Sauton's, and 5 per cent. glycerine bouillon media. In each case the growth on Dorset's media was greatest and the growth on the 5 per cent. glycerine bouillon least. The growth, on the three media estimated as percentage of dried bacilli per 100 cc. fluid media, gave the proportions of 10 : 2·5 : 1 for human and bovine strains and 10 : 1 : trace for the avian strain. The Dorset's tuberculin gave the strongest specific reaction and the weakest non-specific reaction on guinea-pigs.

(4) Avian tuberculin prepared on 5 per cent. glycerine broth and on Dorset's media produced no non-specific reaction on hens infected with *Salmonella pullorum*. The synthetic tuberculin proved to be a more reliable diagnostic agent than the old tuberculin, giving stronger reactions. Even twice diluted it also proved superior to a commercial tuberculin.

(5) Refined tuberculin (PPD) and a simplified form of it did not give stronger reactions than the mother tuberculin when tested on infected calves and guinea-pigs. "PPD" is expensive to prepare and appears to have no indication in veterinary practice.

(6) Attempts to separate the toxic and cutaneous factors by ultra-filtration through 5 and 10 per cent. glacial acetic collodion were not successful. The ultra-filtrates contained little activity, while the residue contained both factors.

A. T. P.

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[**The Treatment of Demodectic Mange of Cattle with Neosalvarsan.** Purchase, H. S. (1930) *Vet. J.* **94**, 2. 75-77.]

The treatment of two different types of infection in cattle in Northern Rhodesia is described.

Case 1.—This occurred in an old cow and was unusual in the rapidity of its onset. The beast ceased to graze in the morning and was rubbing continually against any available object. By the evening the whole body was oozing serum and the temperature was raised to 107·2 deg. Many very active follicular parasites were found on microscopical examination. 1·2 gm. of neosalvarsan were given intramuscularly. The next morning itching had ceased, the temperature was normal and the serum ooze stopped. Thirty-six hours later no parasites were to be found, and an uneventful recovery was made.

Case 2.—This was typical of the usual type of infection found in this area. A few follicles containing sluggish parasites were present which increased rapidly in number at the onset of the hot weather, being followed by scratching and general itchiness. 0·9 gm. given subcutaneously stopped the rubbing and caused healing of the follicles. Ten days later, however, some parasites could still be found. Further injections while not actually curing the disease altogether, caused a very marked improvement in general condition.

B. B.-J.

REVIEW

[**The Structure and Composition of Foods.** Vol. III, by A. L. Winton and K. B. Winton. Published by John Wiley & Sons, New York. (London, Chapman & Hall, Ltd.) Price 40s.]

The complete work of the authors is to be in four volumes, of which three have now been published. The first described cereals, starch, oil seeds, nuts, oils and forage plants; the second, vegetables, legumes and fruits, and the present volume deals with milk (including human), butter, cheese, ice cream, eggs, meat, meat extracts, gelatine, animal fats, poultry, fish and shell fish. To the veterinarian this latter volume is obviously of most interest and it should prove to be a most useful reference book in every veterinary institution.

The section describing milk includes short descriptions of the milks of various animals, and a number of milk products, such as artificial milks, fermented milks, condensed milks, milk powders, butters, butter substitutes, cheese, whey and ice cream; in fact, almost every food product that can be obtained from milk seems to be described. The other sections are equally comprehensive. Eggs, frozen eggs, dried eggs and egg substitutes are dealt with in the chapter on eggs. Part III is devoted to animal products such as meat, poultry, fish, shell fish, crustaceans and reptiles. The chemical constituents obtained from animal products are first described and then the various animal products themselves. The macroscopic and microscopic structure of the various cuts and organs and their chemical composition is concisely given.

It is impossible in a review to indicate in greater detail the mass of information available in the book. As far as can be ascertained the text is remarkably free from errors.

The book is not one which should be read as a whole, but it is an excellent book of reference. It contains a collection of data on the structure and chemical composition of foodstuffs of animal origin which is not available elsewhere. The price seems high, but in view of the amount of information given and its inaccessibility elsewhere it cannot be regarded as an unfair charge. This volume should certainly find a place in all institutions connected with work upon animals and their products.

REPORT

[Palestine: Report of the Veterinary Service for the year ended March, 1937. [Smith, J. M.] 34. 4 annexures. Reprint extracted from the Annual Report of the Department of Agriculture and Fisheries, for the year ended March 31st, 1937.]

(1) The condition of livestock throughout the year was good. The disturbed state of the country has rendered field work difficult, but despite this, good progress has been made with animal husbandry.

(2) With the exception of two new technical appointments, the staff of the Veterinary branch remained the same.

(3) Expenditure for the year amounted to £P.43,298, an increase of £P.1,645. Revenue totalled £P.25,860, a decrease of £P.4,205 which is almost entirely accounted for by the drop in stock imports caused by internal disturbances and economic depression.

(4) There were no outbreaks of serious epizootic diseases during the year in question. An outbreak of foot-and-mouth disease introduced by stock smuggled from Syria was controlled by quarantine; it was of the mild type. The losses from tick fevers continue to decline in those areas where dipping is practised. Control of bovine contagious abortion is making progress. A bovine tuberculosis survey shows the incidence to be 11 per cent. With a view to the eradication of the diseases concerned, the examination of horses for dourine, glanders and epizoötic lymphangitis continues. Infected animals are destroyed with the exception of mares whose blood is positive for dourine; these are branded and their use for breeding prohibited. Diseases such as anthrax and rabies are controlled by the usual methods. Towards the end of March an undiagnosed virus disease occurred among poultry near Nazareth; the mortality reached 98 per cent.

(5) The number of animals imported decreased by 200,000 to 320,000: details are shown in the appendices. The number of slaughter cattle imported remained almost stationary; over two-thirds came from Rumania.

(6) A further increase in the number of cases of bovine tuberculosis detected at slaughterhouses is recorded; parasitic infections remain the chief causes of condemnations.

(7) The Department is responsible for the health of animals belonging to the Police Force and British Troops.

(8) Animal husbandry continues to expand, castration of scrub stock continues, and selected bulls are issued on loan to villages. Under the Government's Premium Scheme 13 bulls and 33 jackasses were selected in different villages and their owners granted premiums in return for allowing these animals to be used for service in the respective villages. Poultry stations and apiaries have developed satisfactorily.

In annexure "A" the Veterinary Pathologist gives his report. Apart from the usual routine work the chief points of interest are as follows:—Four strongly positive cases of Johne's disease were confirmed. The virus nature of infectious pleuro-pneumonia of goats was confirmed and it was shown to be communicable to sheep, a fact not previously described. A severe mortality in chicks was found to be due to *Bacillus coli* (*B. neapolitanum*). Bacillary white diarrhoea has not yet been recorded. The sera of 2,201 horses were subjected to the complement fixation test for dourine—2·03 per cent. were positive.

In annexure "B" the Stock Farm Manager records the number and variety of the stock held. Selective breeding experiments are continually being carried out and a nucleus of sires suitable for issue on loan maintained. Courses of instruction are given.

In annexure "C" the Senior Poultry and Bee-keeping officer discusses the lines along which improvement is being attempted. He states that imported poultry deteriorate from year to year and therefore fresh stock must be continually imported to maintain the quality of the stock. On the other hand, he reports that selective breeding of Baladi hens has resulted in a considerably improved bird that is more resistant to local conditions and diseases than imported birds. [It would appear that in tropical and semi-tropical countries, selective breeding of indigenous stock is the right line along which to work.] Modern bee-keeping is encouraged, hives are inspected for disease and duty-free sugar is supplied.

In annexure "D" are some fourteen appendices.

R. F.

At a meeting of the Council of the National Pig Breeders' Association held in London, General Sir Wyndham Knight presiding, 62 new members were elected, bringing the total number elected during the last six months to 171. The Chairman, in referring to the establishment of this considerable number of new herds of pedigree pigs, said that although farmers were still anxiously awaiting news of the pigs scheme, there was evidently still interest in the production of quality breeding stock. But as pedigree breeders they depended on the demand from commercial producers and the delay in announcing the new contract was very regrettable.

VICTORIA VETERINARY BENEVOLENT FUND

MEETING OF COUNCIL

A meeting of the Council of the Victoria Veterinary Benevolent Fund was held at No. 10, Red Lion Square, London, W.C.1, on Thursday, June 23rd, 1938, when the following members were present: Lt.-Col. J. W. Brittlebank (President) in the chair, Messrs. G. H. Livesey, G. H. Locke, J. W. McIntosh, Mrs. M. S. Nickinson, Lt.-Col. P. J. Simpson, Mr. Arnold Spicer, Mrs. W. G. Wragg, Capt. W. G. Wragg, Lt.-Col. T. Dunlop Young.

The minutes of the previous meeting held on April 7th, 1938, having been published, were taken as read and signed as correct.

Secretary's Report

The Secretary submitted the following report which was approved :—

New Subscriptions.

	£	s.	d.
T. I. Alexander	0	10	0
Hugh Bain	0	10	6
A. Baird	1	1	0
N. S. Barron	0	10	6
A. K. Cameron	0	10	6
C. E. Hall	1	1	0
W. Hughes	1	1	0
Capt. R. D. Mackintosh ..	1	1	0
I. E. Nicol	0	10	6
Dr. J. B. Sewell	0	10	6
Capt. A. R. Smythe	1	1	0
E. A. Tutton	1	0	0
Veterinary Medical Association of Ireland (specially raised for the purpose of making a substantial contribution to the current account)	163	0	0
	£172	7	6

Donations.

Collecting Boxes.	£	s.	d.	£	s.	d.
Central Veterinary Society ..	4	5	0			
Derbyshire Veterinary Association	0	16	0			
North of Scotland V.M.A. ..	2	10	0			
				7	11	9
J. H. B. Best				2	2	0
Edith Everard (dec'd) balance of legacy				3	11	3
R. C. U. Fisher				2	2	0
A. Houston				2	2	0
North of England Ladies' Effort				25	0	0
W. W. Smart				1	1	0
C. D. Watkins				0	10	6
Western District Dunbartonshire Agricultural Association (per Mr. W. S. McMurrich and Mr. J. McDougall)				5	0	0
				£49	0	6

It was resolved that letters of thanks be sent to the respective donors.

Cases

157. Widow. The Secretary reported that this lady died on April 24th, 1938.

175. Widow, aged 57. Living with brother. The Executive Committee reported that since the previous Quarterly Meeting they had received further correspondence relating to this recipient and recommended that the grant of 10s. per week be continued.

The recommendation of the Executive Committee was approved.

190. Wife of unemployed member, aged 47. One child. The Secretary reported that the husband had secured employment immediately after the last meeting of Council and that therefore the grant then made had not been paid. No further application had been received.

204. Son of deceased member. Aged 12. School reports were received in respect of this boy and the grant of £12 per annum to cover school fees was renewed.

212. Widow, aged 69. One son, aged 30: married, with two children. The grant was increased to £1 per week for the present quarter.

215. Daughter of deceased member. Aged 61. The Secretary reported that this recipient had died in the month of April.

215a. Daughter of deceased member. Aged 72. Now unemployed and receiving Old Age Pension. A grant of 10s. a week was made in this case.

216. Widow, aged 60. Two sons, two daughters. Receives £2 weekly from boarder. Children allow £49 p.a. No grant was made in this case.

127a. Daughter of deceased member. Aged 74. Only income Old Age Pension. The grant of 10s. p.w. was continued.

Hunting Memorial Fund.—The Secretary reported that the tombstone of the late Mr. Hunting required attention and that it was desirable to add the names of his son and daughter who died in 1937. The cost could be borne out of the capital of the Estate. He was instructed to have the necessary work put in hand.

Investments.—The Treasurer was authorised to invest the balance in the Donations Account in a suitable security.

N.V.M.A. DIVISIONAL REPORT

Central Veterinary Society

Streptococcus infections and their treatment figure very largely in recent medical literature, and the application of this subject to conditions met with in animals, by Dr. A. W. Stableforth in a paper to the Central Veterinary Society, attracted a large attendance at the meeting held at the Conway Hall, Red Lion Square, London, on June 2nd, 1938.

The President (Dr. J. McCunn) occupied the chair, and there were also present:—Messrs. L. S. Balls, W. Brown, G. N. Bushman, H. E. Bywater (Hon. Secretary) and W. H. Chase, Professor T. Dalling, Major W. Denington, Miss C. M. Ford, Mr. C. Formston, Dr. Tom Hare, Sir F. Hobday, Messrs. J. W. H. Holmes and H. D. Jones, Miss K. Hernaman-Johnson, Messrs. R. C. Irving, Herbert King, H. C. P. King, N. S. King and W. S. King, Lt.-Col. G. P. Knott, Miss Marjorie B. Levy, Miss B. L. Lock, Messrs. A. B. MacIntyre and J. W. McIntosh, Professor Wm. C. Miller, Dr. R. F. Montgomerie, Messrs. K. Ollerhead, C. W. Ottaway, K. G. Peace, W. Perryman and C. R. A. Powell, Veterinary Lieut.-Colonel G. Rees-Mogg, Messrs. N. J. Scorgie, P. M. Sutton and Alex. Thomson, Miss O. Uvarov, Messrs. P. W. Walker and S. B. Vine, Professor G. H. Wooldridge, Dr. W. R. Wooldridge and Professor J. G. Wright. *Visitors.*—Messrs. J. R. Barker, N. S. Barron, D. Craddock, H. E. Cubban, Miss J. Francis, Miss M. Fussell, Messrs. I. A. Galloway, F. D. J. Good, N. Glynn, A. S. Hignett and M. G. Hignett, D. Howell and J. W. Jolly, Miss G. O. Joshua, Miss G. J. Joss, Messrs. R. Lawton, A. M. Lovell, H. Meve, Mr. H. S. Purchase and Miss K. M. Sandver.

The minutes of the business section of the March meeting, having been published in the *Veterinary Record*, were taken as read, confirmed and signed.

Correspondence.—(1) From Mr. G. N. Gould, Major Hamilton Kirk, Mr. G. H. Livesey, Major-General Sir John Moore, Lt.-Colonel W. S. Mulvey, Mr. J. F. D. Tutt, and Mr. Sidney Villar, apologising for their inability to attend the meeting.

(2) From Mrs. Wilkinson, thanking the Society for the letter which was sent to her on the death of her husband, and also for the wreath which was sent to the funeral.

(3) From Mr. W. Rhodes, formerly of Reigate, and who has now joined the Ministry's staff and is resident in Warwick, intimating his desire to relinquish his membership.

(4) From Captain W. J. Leyshon, also of the Ministry of Agriculture, now stationed at Anglesey, resigning.

(5) From Major F. J. Taylor of Oxford, expressing his intention to resign.

On the proposition of Mr. Jones, seconded by Mr. Perryman, these resignations were accepted with regret.

Nominations. — Mr. J. L. O'Connell of the London, Midland and Scottish Railway Company, was nominated for membership by the President, seconded by the Hon. Secretary.

There being no morbid specimens or subjects of professional interest, the President said that, as Professor Dalling had to leave early and desired to speak to a matter placed later on the agenda, they would take it at that point.

Refresher Course in Poultry Husbandry and Disease

The President informed the meeting that it had been proposed that the Society should run a course on what might be called poultry husbandry, to deal specifically with the husbandry part and also with disease. A provisional course of eleven sessions had been arranged, and they had all had notice of it, at the foot of the agenda and in the *Veterinary Record*. Unfortunately, so far they had received only eleven names, and it was useless to run the course unless 20 were forthcoming. They were starting off, in any case, however, on Thursday, June 23rd, when Mr. Francis, of the Ministry of Agriculture, was coming to the Royal Veterinary College to give them a lecture on the poultry industry, to introduce the subject to them. He would ask Professor Dalling to speak on this matter.

Professor T. Dalling observed that perhaps the members of that Division did not quite understand all that the course meant and why it was contemplating running such a course. He had no doubt that they had seen, from the public Press and from the *Veterinary Record*, that there had been in existence for some time a committee set up by the Minister of Agriculture to enquire into the heavy mortality which existed among poultry at the present time. It was called the Poultry Technical Committee and after many months' deliberations this committee had issued its report a few weeks previously.

The gist of this report was in two sections. First, the committee showed that there was a very large mortality in poultry, and they suggested certain measures whereby there could be acquired knowledge regarding that mortality. That, however, did not quite concern the meeting at the present moment. The other part was that the Poultry Technical Committee advised that immediate steps should be taken to control the distribution of breeding stock in this country. In order to do this, the committee had recommended that a commission be set up to establish the requisite organisation. That commission would consist of lay people mostly, but it was hoped that veterinary representation would be obtained. The commission

would be guided by two advisory councils, one representing Scotland and the other England and Wales. It was hoped that the commission would be able to introduce measures whereby all breeders in the country would be registered.

To come now to the particular reason for the establishment of these "refresher" courses, the intention was that panels of veterinary practitioners should be appointed in various districts to assist the commission in ascertaining the existence of health or otherwise in this stock.

The N.V.M.A. did not see eye to eye with the report in every particular, and the Association had met certain representatives of the Ministry of Agriculture and of the Secretary of State for Scotland concerning these points. The main thing, however, was that without any doubt the report would be accepted practically as it stood by the Government Departments and that legislation would be brought into force, probably in the autumn of this year, concerning the control of breeding stocks in this country. That meant that the veterinary practitioner would be asked to join panels which would be concerned with advising on the health of that stock.

The N.V.M.A. considered it would be a good idea if, when these panels were formed, the veterinary practitioners were well acquainted with the latest work in poultry husbandry and disease control, and they had, therefore, written round to all the Divisions asking the secretaries to secure some information for the Council of the "National" regarding the possibility of running refresher courses. He was very pleased to learn from the Secretary of the N.V.M.A. of the good response which the various Divisions were making. Divisions whose members were in the country were more concerned with those courses than were Divisions in the towns, but it was felt that, as there were many members of the Central Veterinary Society whose practices lay in the country, they should be given the opportunity of participating.

They might wonder why he, particularly, was speaking on that matter: it was because he happened to be Chairman of the N.V.M.A. Advisory Committee on Poultry Diseases.

The PRESIDENT, having read out the headings of the proposed course, said that if those who were interested would hand in their names to the Secretary, it would give them a guide as to whether they could run that course or not.

Paper.—The PRESIDENT now called upon Dr. A. W. Stableforth to present his paper on streptococcus infections in animals and their treatment. The discussion, which was opened by Captain G. N. Bushman, was well sustained, and at the close of the essayist's reply he was heartily thanked from the Chair. [Dr. Stableforth's paper, with a report of the discussion and of the reply, will be published in a later issue of the *Record*.]

There being no other business, the CHAIRMAN declared the meeting closed, the members having expressed their thanks to him for his conduct of the proceedings.

H. E. BYWATER, *Hon. Secretary.*

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Aug. 17th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 4 p.m.

Aug. 21st-25th.—Thirteenth International Veterinary Congress, Zürich.

Aug. 26th-27th.—Thirteenth International Veterinary Congress, Interlaken.

Sept. 5th-9th.—Annual Congress, N.V.M.A., at Glasgow.

Sept. 8th.—Annual Dinner of the Royal (Dick) Veterinary College Alumnus Association at the Ca'dora Hotel, Glasgow, 6.30 p.m.

Sept. 20th.—Applications due for Miss Aleen Cust Veterinary Research Scholarship.

R.C.V.S. Examination Committee Special Meeting.

Oct. 5th.—R.C.V.S. Committee Meetings.

Oct. 6th.—R.C.V.S. Committee Meetings.

Oct. 7th.—R.C.V.S. Committee and Council Meetings.

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N.V.M.A. CONGRESS

SOMETHING FOR THE LADIES

If we had had the task of providing the ladies with something to do while their men folks decided just how the profession should settle its problems, we might have felt complacent in the knowledge that the shops in Glasgow were attraction enough in themselves. The Empire Exhibition authorities, however, recognising that the success of the Exhibition demanded much more than good shops in the City, very wisely provided shop windows of the Empire, in the Women of Empire Pavilion.

This Pavilion, situated on Kingsway opposite the United Kingdom Pavilion, contains three exhibition halls, a fashion theatre and reception room, with a tearoom adjoining.

Displays of handicraft by countrymen of the Empire are shown. The beauty of much of this work is beyond description. Everything of

beauty for the home is displayed: needlework, water colours and sculpture by well-known women artists, silks and brocades; a decorative panel presented by the National Council of Women shows the trades and professions in which women are employed to-day, and model kitchens with many novel features have, we hope, still a fascination for the fair sex, who also will be intrigued by the many demonstrations of cookery—and a Bureau of Dietetics.

In the Fashion Theatre, which is most artistically designed and decorated, there are four mannequin displays daily, of British fabrics by British designers. A display of historic dresses from the time of George III to the present day is one of the most interesting exhibits.

Among other feminine interests of the Exhibition might be mentioned the country house and two "working-class" flats, both fully furnished, and a Clachan (The Highland Village) showing examples of the types of house from the "Black House" to the present day. The character of this feature of the Exhibition is supported by typically Highland men and women spinning and weaving and the smell of "peat reek."

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PERSONAL

Marriage.—Ottaway—Luckin. On July 30th, at St. Mary's Church, High Easter, Christopher Wyndham Ottaway, M.R.C.V.S., of the Royal Veterinary College, London, youngest son of Mr. and Mrs. W. H. Ottaway, of Enfield, to Miss Grace Luckin, younger daughter of Mr. Edgar Luckin, J.P., and Mrs. Luckin, of The Parsonage, High Easter

A reception was held at The Parsonage, a large number of guests attending, and later Mr. and Mrs. Ottaway left for the honeymoon, which is being spent in Germany and Switzerland.

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West African Colonies Commission.—Lieut.-Colonel A. G. Doherty, M.C., F.R.C.V.S. (Secretary to the Royal Zoological Society of Ireland, Dublin) is one of the technical experts appointed to assist the committee of enquiry which, as announced on August 5th, is to be set up on the initiative of the trustees of the Leverhulme Trust, to conduct an enquiry in West Africa.

The terms of reference include the study of animal industries and the possibility of their extension, both by the improvement of breeds and by the utilisation of the products; also the general study of soil conditions including the questions of soil deterioration by methods of cultivation or by erosion and desert invasion, and soil improvement by better methods of cultivation.

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University of Toronto.—Mr. A. H. Hunter, M.R.C.V.S., D.V.S.M., an Inspector of the Ministry of Agriculture, has been awarded the Degree of Doctor of Veterinary Science by the University of Toronto, of which he was a graduate, on a Thesis entitled "The Sheep Industry of Patagonia."

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Engagement.—The engagement is announced between James, only son of Mr. and Mrs. Wright, 50, Cabin Hill Park, Knock, Belfast, and Evelyn Sarah, only daughter of the late Mr. Scott and Mrs. Scott, 13a, Gorsedale Road, Wallasey, Cheshire.

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UNIVERSITY OF LONDON EXAMINATIONS IN VETERINARY SCIENCE

Following is the July pass list for the examinations in Veterinary Science convened by the University of London:—

First Examination (for internal students), Smith, Gordon John Edward (Battersea Polytechnic and Royal Veterinary College); Waterman, James Frederick (Royal Veterinary College); (for external students), Ayliffe, Alec Ronald (Royal Veterinary College).

Second Examination (*Part I*) (for internal students), Balankura, Kamhaeng; Hall-Patch, Peter Kenelm Joseph; Markham, Antony Edward Graham, and Smith, Herbert Williams (all of the Royal Veterinary College).

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R.C.V.S. OBITUARY

Power, Robert James, West End, Mallow, Co. Cork. Graduated Dublin, July 23rd, 1934. Died August 4th, 1938.

Taylor, Christopher, Bunker Hill Farm, near Consett, Durham. Graduated London, December 16th, 1905. Died August 1st, 1938; aged 56 years.

Villar, Sidney, Amersham Common, Bucks. Graduated London, April 1st, 1880. Fellowship April 24th, 1890. Died July 28th, 1938.

Young, Colonel Alexander Reid, of Daniell Street, Wellington, New Zealand. Graduated Edinburgh, April 23rd, 1886. Died June 27th, 1938.

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Mr. R. Power

Mr. R. Power, who had been involved in a road accident near Rathcoole, County Dublin, died in Steevens's Hospital, Dublin, from his injuries.

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Mr. Christopher Taylor

Mr. Christopher Taylor, who, in addition to following his profession, farmed extensively, was a well-known personality in Durham and Northumberland. He practised in Morpeth before the War, and during the War served with the Royal Army Veterinary Corps and reached the rank of captain. He went to Leadgate, North-West Durham, in 1919, took over East House Farm, and remained there until eleven years ago, when he transferred to Bunker Hill Farm. His services as a veterinary surgeon were in demand over a wide area and, in addition, he was veterinary surgeon to Consett Iron Company. He has left a widow, two sons and one daughter.

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Captain Sidney Villar

Captain Sidney Villar, who was a member of Council, R.C.V.S., from 1896 to 1912, was Vice-President in 1899 and again in 1904. He was also for some years Vice-President of the Victoria Veterinary Benevolent Fund. Captain Villar died after a sudden illness, in his eightieth year. The burial took place, following cremation, on Tuesday, August 2nd. There were no flowers by request and the ceremony was attended only by close relatives.

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Colonel A. R. Young

Colonel A. R. Young, whose death is recorded above, was for many years in the service of the Department of Agriculture at Wellington. He served in the Great War and was A.D.V.S. to the N.Z.V.C.

JUBILEE MESSAGE FROM THE VETERINARIANS OF AUSTRALIA

We welcome the opportunity of supplementing the many messages of greeting and congratulation on the attainment by this journal of its Jubilee and published in our special issue of July 16th, by the communication, dated June 24th, which has just reached us from Dr. A. W. Turner, Editor of the *Australian Veterinary Journal*, representing as it does also, the tribute of Mr. W. L. Hindmarsh, President, and Mr. G. Edgar, Hon Secretary, of the Australian Veterinary Association, on behalf of the members of that body.

The message runs: "I should like to take this opportunity of expressing the high appreciation in which the *Veterinary Record* is held by veterinarians in Australia, especially since it became the property of the Association in 1921.

"It can be safely claimed that the *Veterinary Record* is one of the leading veterinary journals in the world. The high standard and variety of its original contributions, the extremely valuable annotations and the carefully selected abstracts make it an indispensable publication for research workers, administrators and practitioners in all countries; to us in Australia it has the additional attraction of keeping us in touch with veterinary politics and professional activities in the Motherland; finally, as the official organ of the National Veterinary Medical Association, with which the Australian Veterinary Association is affiliated, it has a special appeal to readers of the *Australian Veterinary Journal*. It is therefore not difficult to understand why the *Veterinary Record* is so popular in Australia. Indeed, many of us would like to see it regularly distributed to all members of the Australian Veterinary Association just as our own journal is.

"The *Australian Veterinary Journal* hastens to record its appreciation of the *Veterinary Record* and congratulates it upon the completion of its Jubilee. Few scientific journals can boast such a record, certainly few that appear weekly. It is safe to say that, being now the property of the N.V.M.A., it may be regarded as a permanent institution among British scientific literature."

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R.C.V.S. LIBRARY

The Central Library for Animal Diseases of the R.C.V.S. will be closed until the end of August.

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Viscount Milton, County Appeal Treasurer for the Boy Scout Fund in South Yorkshire, has received from the Yorkshire Society for the Encouragement of Humane Treatment to Pit Ponies, a donation with the following comment from the Secretary, Mr. A. N. Mallinson: "You may wonder why a Society like this is interested—the reason is obvious. Members of my committee, being mining men, are naturally interested in the large number of pony drivers they employ, and feel that any encouragement offered to lads who at some time may work in their collieries will show itself in that particular lad's treatment of ponies under his charge."

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ANIMAL DISEASES RESEARCH ASSOCIATION

Dr. Russell Greig, the director, reviewing the work of the Moredun Institute at the recently held annual general meeting of the Animal Diseases Research Association, said that during the year the Institute had issued 67,300 doses of braxy vaccine, 72,200 doses of lamb dysentery serum, and 112,000 doses of louping-ill vaccine. It had been found that by means of these products these three serious diseases could be effectively controlled.

Dr. Greig said that the economic importance of the sheep tick could not be too strongly emphasised. Some years ago the Institute had carried out extensive research on the habits of the tick and the environmental factors by which its activity was governed. It was only upon such knowledge that rational measures of control could be based. Government had recognised the need for the continuance of this work, and the Association was collaborating with Edinburgh University and with the Agricultural Colleges in an investigation based on national lines of effort.

The Institute was playing its part in the integrated schemes of research on contagious bovine abortion and mastitis which were being carried out by committees set up by the Agricultural Research Council.

On the subject of grass sickness in horses, Dr. Greig said that this year another determined effort had been made to advance knowledge in this disease. A large proportion of the staff had been working at the field research station which had been established at Kintore, in Aberdeenshire. Because of the relatively short period during which the acute type of the disease was prevalent, the work had had to be conducted on intensive lines. It was yet too early to discuss the results of the work, but it could be said that, while a number of possible causes had been eliminated and knowledge of the pathology of the disease had been considerably advanced, they were still without knowledge of the actual cause.

In view of recent advances in the study of scrapie, the Institute had taken over an experimental hirsel where there could be carried out large-scale field experiments designed to determine the nature of scrapie with the ultimate object of evolving a means for its prevention.

Reference was made to the extension scheme of the Institute which should be completed by the end of the year. The extension consists in the addition of two wings containing research laboratories and service rooms, and the erection of two blocks of animal houses with a large-animal metabolism room.

The extension was estimated to cost approximately £10,000, but the whole of this sum had been obtained.

Mr. Falconer L. Wallace, the Chairman, paid a tribute to the late Principal O. Charnock Bradley, who was a director of the Association.

THE BROWN RIBBON OF GERMANY

[Contributed]

For a whole week Munich has been *en fête*, for on Sunday the "Brown Ribbon of Germany," which compares in importance in the German world of racing to our English Derby, was run in that city.

The town has been filled with sporting people from all countries and the "International Congress for Thoroughbreeding and Racing," with President Christian Weber at its head, has extended the warmest hospitality to its invited guests. Among these there were delegates present from France, Czechoslovakia, Roumania, Hungary, Switzerland, Italy; whilst England was represented by Captain Hitchcock, so well known at the Olympia International Horse Show, and Sir Frederick Hobday, who delivered an address on "Thirty Years' Experience of the Ventricle Stripping Operation for Roaring." Prince Ali Khan ran Dardanelles II, and went himself to see the race, meeting with a very cordial reception.

This is the fifth consecutive year of the Congress, which owes its inception to the sporting instinct of its President, Herr Christian Weber, whose efforts have carried it to its present success; the "Brown Ribbon of Germany" being the climax of the racing festivities. In addition to the title "International Champion on the Flat" being given, there is also a "Brown Ribbon of Jumping," and the enthusiasm displayed at the races this week has been definite indication of the great regeneration of racing in Germany. The setting for the scene at Riem with its central lake lends itself in every way, for the whole course can be seen from anywhere and it is adaptable equally to racing on the flat, to steeplechasing, and even to trotting matches.

The weather was glorious—brilliant sunshine the whole time. Banquets, receptions, and other festivities were in keeping with the rest of the programme; and President Weber, together with his able Lieutenant Baron von Kuensberg at the Council of Management left no stone unturned to make sure that the welcome accorded the guests was one which would not be readily forgotten.—*Munich, August 1st.*

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ETHICAL PHARMACEUTICALS ASSOCIATION

Mr. A. C. Henry, the Chairman, presiding at the Third Annual General Meeting of the members of the above Association, held in London on July 19th, in reporting to members on the work of the Association, said that on several occasions the committee of the Association had been asked to consider questions concerning sales policy both in regard to supplies to the medical profession and to wholesale and retail chemists, and to consider whether the Association could recommend the adoption of some particular line of action such as uniformity in discounts and trade terms. Matters of that kind were, however, fraught with difficulties and the committee was of opinion that any move by the Association in the direction he had mentioned would, at the moment, be undesirable.

Proprietaries listed in the National Formulary was another matter that had been discussed by the committee. The practice of adding to the National Formulary the names of articles alleged to be the equivalent of listed proprietary products was not altogether satisfactory and in the opinion of the committee the position called for careful examination in order that the proprietary rights of manufacturers of ethical preparations might be safeguarded.

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BIONOMICS OF A CATTLE LOUSE

In a letter to the Editor of *Nature* (May 21st, 1938, issue), Craufurd-Benson calls attention to the fact that the sucking louse, *Solenopotes capillatus* Enderlein, 1904, appears to be more common in Britain on cattle than had hitherto been supposed. This louse was known for many years only by a single record from Germany but was reported by Bishopp in 1921 to be common in the United States of America and has since been found in England by the late Noel Pillers and in Australia by O'Conner and by McCulloch and Noble.

During studies of the life histories and bionomics of cattle lice, Craufurd-Benson found that there appeared to be a high incidence of *S. capillatus* in Hertfordshire and he also recovered it, during April, 1938, from cattle in Perthshire and Dumfriesshire. The author mentions that this is believed to be the first record of the occurrence of this louse in Scotland. It would appear, from the available evidence, that *S. capillatus* can no longer be considered as rare in Great Britain but shows a fairly wide-spread distribution on both sexes of cattle of all ages; further surveys will probably confirm this. As a result of these findings, Craufurd-Benson points out that *S. capillatus* should be included with the other three well-known forms attacking cattle, *viz.*: the red biting louse, *Bovicola bovis* (or *Trichodectes scalaris*), the "short-nosed" cattle louse. *Haematopinus eurysternus*, and the "long-nosed" cattle louse, *Linognathus vituli*, when control measures are being considered.

J. N. O.

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EDINBURGH PATHOLOGICAL CLUB

We were glad to note, from a contribution from the *Lancet's* Scottish correspondent in the May 7th issue, that some veterinary research workers are taking an active interest in this Club. It will be recalled that one of its original members was Sir John M'Fadyean, the doyen of veterinary pathology, who derived great benefit in his early training from the contacts which he made, at the beginning of his career, at this Club.

"Fifty years ago the Edinburgh Pathological Club was founded, partly at the instigation of Sir John Batty Tuke. The first Secretary was Dr. later Sir, German Sims Woodhead, F.R.S. Of the original members, among whom was Professor W. S. Greenfield, three survive, namely, Sir Robert Philip, Sir Richard Berry, and Professor William Russell. To celebate its jubilee the club held a dinner recently at which 50 members were present. Sir Robert Muir, F.R.S., gave an interesting account of early days and others who spoke were Professor Sydney Smith, Dr. Edwin Bramwell, Professor Stuart McDonald, Professor Theodore Shennan, Dr. Chalmers Watson, Professor Henry Dryerre, and the Secretary, Mr. C. P. Stewart, Ph.D. Professor A. M. Drennan presided.

The members of the club are recruited from the younger research workers in Edinburgh who welcome the opportunity of bringing their results forward for discussion in a domestic atmosphere and regard membership of the club as an honour. The range of subjects in the annual programme is wide, including morbid anatomy, biochemistry, experimental surgery, experimental

pathology, and veterinary diseases. It is a satisfaction to members that several pathological clubs have been formed on the same lines in other places, for example, Glasgow and Newcastle, by former members of the Edinburgh Club. This remains one of the places at which those interested in medical research congregate, and its usefulness seems likely to continue."

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THE ANAEROBIC BACTERIA

We reproduce the following annotation from the *Lancet* (May 21st, 1938), for, as is well known to all our readers, anaerobic organisms, particularly in cattle and sheep, are of transcendant importance to the veterinarian, and any further advance made upon their study will be welcome.

"The group of bacteria characterised by growth in reduced oxygen tension has peculiar interest; it contains some of the most chemically active organisms whose power to ferment various substances is astonishly well developed. From the point of view of human disease its most important members are the organisms responsible for the gas gangrene infections of wounds and the bacillus secreting the tetanus toxin. An encyclopaedic treatise* dealing with the anaerobic bacteria has recently been completed by Dr. M. Weinberg and his collaborators at the Pasteur Institute. Dr. Weinberg has made a life's study of these organisms, has made contributions over more than 20 years to the now vast literature on the subject, and is the senior author of two previous treatises. In this new work an attempt has been made not only to include all the known anaerobic species but to record first-hand observations upon a considerable proportion of them. Not that it has been possible to elaborate a sound classification for the group as a whole. Indeed the collection together of organisms merely on the score of their anaerobic growth even where reduced oxygen tension is an obligatory condition of proliferation can hardly be defended on systematic grounds. But there is some convenience in having under one cover descriptions of all the various kinds of anaerobes—the spore-bearing Gram-positive, the Gram-negative, and anaerobic cocci, and the forms valuable in agriculture and industry, such as the cellulose fermenters and those which attack the glucosides and pectins. Actually the authors have tried to include too much; the long list of organisms stigmatised as 'insufficiently described' might have been considerably enlarged by the transfer to it of some others to which undue prominence is given, and the list, once made, could have been safely omitted from further consideration. Among the better-known types we have noticed no important omissions nor has any aspect of their study been neglected—cultivation, biochemical reactions, serology, incidence, pathology, and so on are all discussed with full reference to original sources. The excellent table of contents and the alphabetical list of the organisms dealt with do not compensate for the lack of an index. The work will be useful to bacteriologists and pathologists, human and veterinary; the days when the anaerobes were neglected in clinical pathology are over but the difficulty of finding detailed information about this group or of the proper technique to use has still an inhibitory effect on their study."

*Les microbes anaérobies. By M. Weinberg, R. Nativelle, and A. Prévot. Paris: Masson et Cie, 1937. Pp. 1186. Frs. 250.

LENGTH OF ELEPHANT'S LIFE

To its account of the recent arrival at the London Zoological Gardens of a baby elephant, the gift of the United Provinces Forest Department, *The Times* appends the following interesting observations concerning the length of an elephant's life: "It used generally to be supposed that elephants lived to enormous ages, well over the century, and did not begin breeding until 30 years old or even later. Recent experience, however, has shown this to be quite erroneous. The collation of data on the longevity of captive animals in the zoos of the world and elsewhere by Major Stanley Flower proved that the great majority of captive elephants die at 35 to 40 years of age, a few surviving to 50, and the record being 51. It is not likely that this figure is exceeded in nature, and in any case the idea that they can live to be 100 must now be dismissed as purely legendary. This is confirmed by breeding records. On several occasions elephants have bred before they were 13, and one female bred at eight years of age. Growth, however, continues until about 16. The maximum weight of a bull elephant is almost six tons. There seems little difference between the African and Indian species in this respect. The cows are much lighter. The late President Theodore Roosevelt in his book on African Game Animals wrote: 'The female elephant is considerably lighter than the male—about two tons lighter.' The period of gestation again is not so long as popularly supposed, being about 87 weeks. The pulse rate, as one would expect, is slow, 25 to 28 to the minute.

"A unique feature of elephant development concerns the growth of the grinding teeth. These come into action successively, never more than one whole pair (or parts of two pairs) being in action in each jaw at any one time. The tooth in action gets gradually pushed forwards, its front edge being at the same time slowly worn away by use until nothing is left. New teeth grow at the back of the mouth and are pushed forwards to replace the worn ones. The succession of teeth takes place at definite intervals, and is doubtless determined by heredity. The length of the elephant's life appears to be correlated with the process of tooth replacement, natural death supervening about the time when the last teeth are due to wear out."

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THE LIFE-CYCLE OF THE RED CELL

"There has been great divergence of opinion as to the time a red cell survives in circulating blood. Authorities set the upper limit at anything from 15 to 100 days, the majority accepting a figure in the neighbourhood of 30 days," says the *Lancet*, in a recent annotation, which continues: "W. B. Hawkins and G. H. Whipple* now bring forward experimental evidence that in the dog at any rate, the average expectation of life among red cells is about 124 days. The observations were made upon bile fistula dogs in a normal state of health, and who showed a constant output of bile-pigment. This pigment output represents, the authors believe, the normal waste products of red cell destruction and can therefore be used as a measure of the amount of destruction taking place. After a control

*Hawkins, W. B., and Whipple, G. H., *Amer. J. Physiol.* 1938, **122**. 418.

period the dogs were stimulated to fill the circulation suddenly with a great mass of new red cells and haemoglobin, the stimulant being either the removal of blood by venesection or the destruction of blood *en masse* by administration of acetyl-phenylhydrazine. This treatment resulted in a preliminary fall in bile-pigment output to low levels, due to lack of red cell destruction, followed after some weeks by a conspicuous rise. This sudden rise was taken as the point at which the newly produced cells started to break down and therefore gave an indication of their duration of life. The time over which pigment output was depressed in four different dogs was 112, 120, 126, and 133 days, giving an average of 124 days. On the basis of the figures obtained the calculated output of bile-pigment averaged 83 mg. per day, while the observed output was 85 mg. per day, figures which show such remarkable agreement as to support the contention that the average life of the red cell, anyhow in the dog, is much longer than has hitherto been thought likely."

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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METHODS OF TUBERCULIN TESTING

To the Editor of the Veterinary Record

Sir,—While discussing the advantages and disadvantages of various methods of testing, there has been little or no reference to the subpalpebral test introduced some years ago by Mr. R. H. Smythe of Camborne. This method of injecting 0·25 c.c. (about 4 minims) of concentrated tuberculin subcutaneously near the inner canthus of the lower eyelid requires only moderate restraint, is easy to perform and is clean in application. One injection is required, reactions (if present) are well-defined, while it is also claimed that advanced cases will respond.

As many can testify, some cows will pass the double intradermal test with little or no increase in measurement or change in character and yet prove on *post-mortem* to be advanced cases, although in fair or even good condition. When using the two tests simultaneously I have in some instances observed an eye reaction while the neck was negative—a *post-mortem* confirming the result.

The observations of some who have tried the test would be interesting. It has been suggested that in the act of injecting tuberculin subpalpebrally a certain amount is introduced intrapalpebrally (intradermally). If this is so it brings the test on a par with the intrapalpebral mallein test which during the War was so extensively employed at home and abroad, proving expedient and efficient in the control and eradication of glanders.

In view of such results an official trial of tuberculin testing applied in a similar manner seems worthy of consideration. In any case a uniform standard in the interpretation of intradermal reactions as is adopted in some countries is very desirable, if not essential. At present the snag in tuberculin testing is the indefinite reaction which may be passed as positive by one and, with equal confidence, as negative by another. Unfortunately, in both instances errors in judgment have far-reaching and possibly calamitous effects.

Yours faithfully,

C. W. Cartwright.

Dyserth,
Flintshire.
August 8th, 1938.

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CONFLICTING VETERINARY EVIDENCE

To the Editor of the Veterinary Record

Sir,—My letter to you the other day on the above matter was so long that I was constrained for very shame at its length to omit the one constructive observation that might have justified an otherwise pessimistic and sterile epistle.

My proposal is that the N.V.M.A. should ask the Home Office to arrange, if possible, for it to be obligatory for expert veterinary witnesses on both sides to consult together in the presence of the animal in question (when that is possible) before the case is heard by the court. As things are at present, such a consultation often does not take place and those of us with experience know that sometimes a consultation is made impossible by the ill-will or design of one or other expert witness. I have actually known of lame horses being hidden away so that a consultation could not occur. Worst of all, I have been refused a consultation in terms that humiliated me and affronted my sense of justice; moreover, if we had been compelled to consult beforehand there would have been a juster sentence and I should not have retained to this day a deep resentment against a bad system.

Yours faithfully,

Wakefield Rainey.

Bloemfontein.
July 11th, 1938.

Errata.—Professor Dr. F. Gerlach writes from Mödling, Austria, to point out that in publishing his message of congratulation in our Jubilee Issue, July 16th, the errors, which we very much regret, were made of stating that the *Wiener Tierärztliche Monatsschrift* is brought out in Leipzig, whereas it is published in Vienna, and that Dr. Gerlach is Associate Editor of the journal in question. The Editors of the *Wiener Tierärztliche Monatsschrift* are Professors Dr. Wirth and Dr. Böhm, both of Vienna.

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We regret that, through being misinformed, we stated in our last issue (p. 1036) that Professor Wooldridge attended as an expert witness for the defence in the recent case Cornish-Bowden *ats.* Damiano. Professor Wooldridge's place was taken by Sir Frederick Hobday.